



## **Welcometo DataTrace RF (DTRF)**

The DataTrace® System is comprised of three primary components. First are the miniaturized data recording and transmitting devices, called MICROPACK RF, MICROPACK III, FRB MICROPACK', MICROPACK' and FLATPACK' Tracers. The second component is the PC Interface System for programming and reading the Tracers, or receiving radio data from the models capable of radio transmission. The third component is a computer and this DataTrace RF software used to control or configure the devices, receive or retrieve and store the logged data, and display the data in various tabular or graphical formats.

The DataTrace® PC Interface, Tracers and software working together, collect and create permanent records of a process. The Tracer is designed to travel with products inside containers as these proceed through a processing environment. This vital information is obtained without depending upon external connections; the Tracers are completely self-contained sensors. The radio transmission capability of the MPRF Tracers allows for obtaining this data in real-time during the process or validation study.

## **What's New in DataTrace RF:**

### [How is DataTrace RF different from DTW](#)

For those already familiar with DataTrace for Windows Software, the differences and similarities between the two; using DataTrace RF with FRB and MPIII Type Tracers.

### [Quick Start](#)

Look here to be logging or viewing radio data in just a few minutes.

## **How to use DataTrace RF:**

### [How to Setup your system](#)

Define communications ports, set preferred units of measurement and other defaults.

### [How to Program Tracers](#)

Configure the data loggers, define Start Time and Date, logging Interval, set Radio Usage options, etc.

### [How to Receive Radio Data](#)

View the data real time, control the Network, re-program via radio, check alarms, summaries, and graphs.

### [How to Read Tracers](#)

Download the logged data from a Tracer; view a summary or graph of the data.

### [How to Test Tracers](#)

Test communications, get diagnostic reports, battery maintenance procedures, etc.

#### [How to get Reports](#)

Generate tabular reports, summaries and graphs for one or more Tracer data profiles.

#### **DataTrace RF Reference:**

The following links provide detailed or additional information for buttons, menus, options and procedures.

#### [Main screen buttons and menus](#)

#### [Program Tracer Wizard](#)

#### [Read Tracer screen features](#)

#### [Radio Network features](#)

#### [Radio Reports and Data Views](#)

#### [System Setup screen controls and details](#)

#### [Tracer Calibration](#)

#### [USB Interface Driver Installation](#)

#### [Data Security and 21 C.F.R Part 11 compliance](#)

#### [Database Utilities](#)

#### [Battery Change Procedure](#)

#### [Warranty, Patents and Trademarks](#)

#### [FCC Statement](#)

#### **Trouble Shooting**

The following links provide information or instructions to diagnose common problems:

#### [Radio Data Reception Problems](#)

What to do if a MPRF Tracer can be programmed and read, but no radio data is received.

#### [Communication Problems](#)

What to do if a Tracer in the Interface cannot be programmed or read.

#### [USB Interface Problems](#)

What to do if the Interface doesn't install or function properly, how to Identify the Comm Port #.

#### [Tracer Reset Error](#)

Reset normally occurs only after a battery change, what to do if it occurs unexpectedly.

#### [Erratic or Inaccurate Data](#)

What to do when the measured values are significantly different than expected.

#### [Tracer Diagnostic Report](#)

How to interpret this report.

#### [Software Problems](#)

What to check and what information to gather when reporting your problem.

#### **Contact Information:**

Mesa Laboratories, Inc  
12100 W. 6th Ave.

Lakewood, CO 80228 USA

Tel: (303) 987-8000

Fax: (303) 987-8989

www.mesalabs.com

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## **What's New in DataTrace RF**

The obvious difference is that DataTrace RF supports MPRF radio Tracers, see [Radio Function Details](#) and [How to Receive Radio Data](#).

Apart from this, when compared to DataTrace for Windows (DTW), DataTrace RF has several new features:

The extensive use of Menus using common naming conventions (such as File > Print) and short-cuts (Edit > Copy is the same as Ctrl+C).

Supports multiple open windows; you can [read a Tracer](#) while receiving radio data from others, or view the last read Tracer while testing another one.

A wizard based [Program Tracers](#) screen simplifies Tracer configuration and programming.

A separate [Test Tracer Utility](#) provides integrated test, diagnostic and maintenance procedures.

User settable preferences to either enable or disable the display of common messages or warnings.

Improved USB communications eliminate the need to select communications serial ports.

## **What is not in DataTrace RF**

Reports and Databases. DataTrace RF requires the installation of DTW 4.05 or greater. The data for Tracers read in DataTrace RF is saved in the DTW database. DTW provides database management, security and reporting tools. DTW may be used for MPII, FRB or MPIII Tracers, or if desired, DataTrace RF may be used to program and read these Tracer models.

Tracer Type Identification. Unlike DTW, DataTrace RF does not automatically identify the type of Tracer or Interface being programmed or read; the Type of Tracer to be programmed, read or tested must be manually selected. DataTrace RF will remember the last

type selection. This limitation is by design In order to allow the convenience of being able to use a MPRF Interface to program or read a MPIII Tracer, or vice versa. Note: DTW version 4.04 will not recognize an MPRF type Interface! DTW Version 4.05 can recognize and use an MPRF interface for communications with an MPIII (but not MPRF) only if the USB drivers have the VCP option enabled (see [USB Driver Installation](#)).

## Quick Start

Most items and controls within DataTrace RF are intuitive, self-explanatory or conform with standard conventions. The following is the basic steps needed to use the DataTrace system.



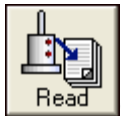
Click the [System Setup](#) Button to open the Setup window. Choose the Display options or units of measure. Set the Comm Port for MPII/FRB models if these will be used. Browse and set other options if you wish.



Click the [Program Tracers](#) button. The Wizard will guide you through the Tracer configuration and programming steps.



If you programmed MPRF (Radio capable) Tracers and want to see the data real time, click the Radio button to access the [Radio Network](#) view . Within a few sample intervals you should see data arrive. Observe what Right and Left mouse clicks on different elements do. Click the upper right graph icon for other radio data views.



Click the Read Tracers button to open the [Read Tracers screen](#) and download your logged data.



Click the Reports button to generate printable reports and graphs in various formats using current or previously saved data.



Click the Database Utilities to Export data, Archive or Delete unwanted profiles, Backup data and settings or perform other maintenance on the database.

## How to Setup your System

For software installation instructions see the DataTrace Operator's Manual.

If you will be using the radio functionalities, you will need a MPRF Host radio receiver. This is a USB device which requires the installation of drivers for proper operation. See [USB PC Interface Installation](#) for further information.

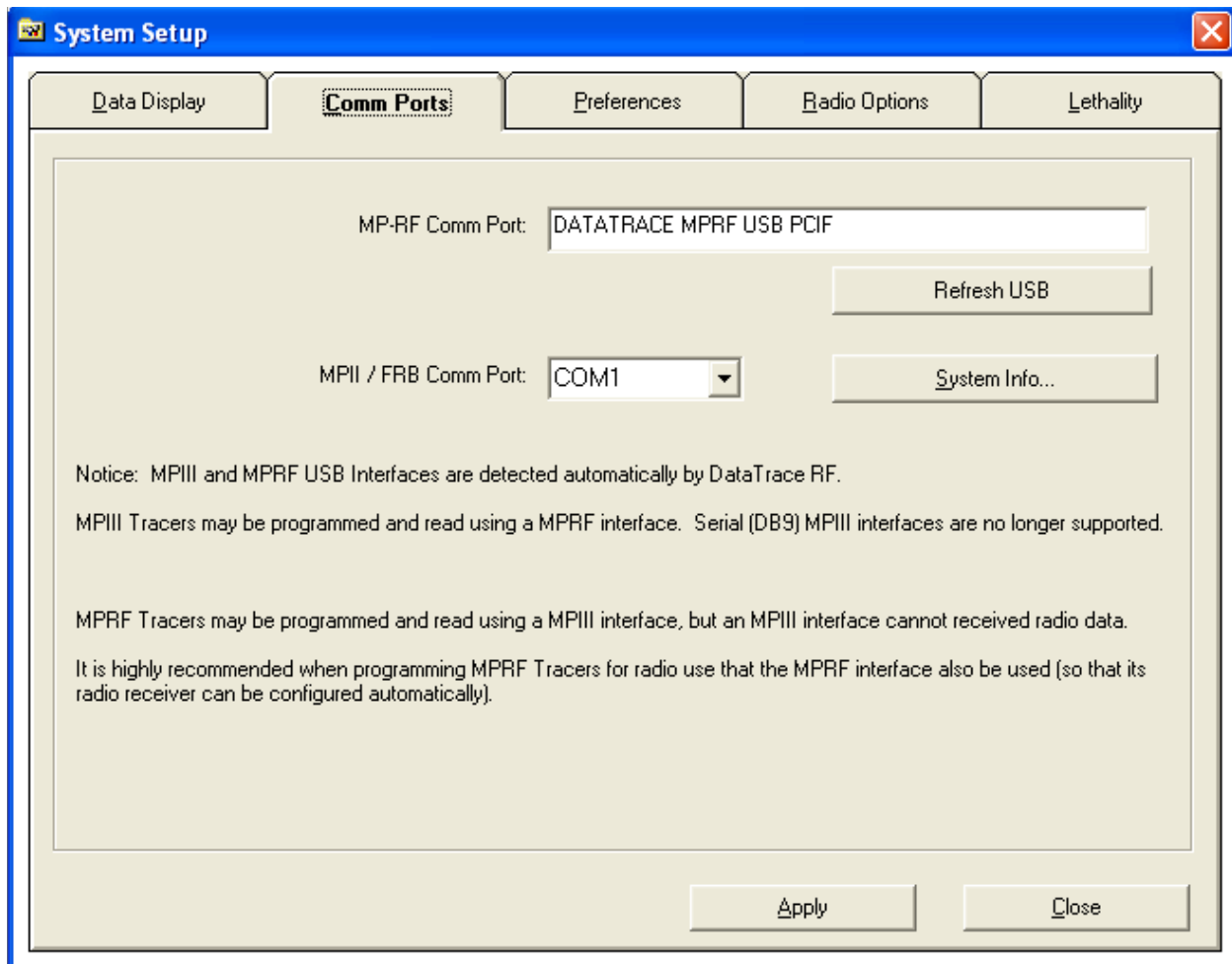
If DTW 4.04 or greater is installed on your computer and has already been configured, DataTrace RF will access the DTW settings and use the same values. DataTrace RF will identify any connected DataTrace USB Interfaces. If MP11/FRB Tracers are going to be used with DataTracerF, the communications port for this type of serial Interface must be selected. All other items or settings are options or preferences.



Click the System Setup Button to open the Setup window.

Access the Comm Ports tab. If a MPRF or MP11 Interface is connected, it's device description will be shown here. If the USB Interface is connected but not shown, try unplugging it and plugging it back in, followed by clicking the Refresh button.

If MP11 or FRB Tracers will be used, select the Communication Port at which the MP11 Interface is connected.



Note: MPRF and MPIII Interfaces may be connected simultaneously if desired. In such an instance, MPIII Tracers will be processed on the MPIII Interface, and MPRF Tracers using the MPRF Interface. If only one Interface is connected, both MPIII and MPRF Tracers will be processed using that same Interface. Two MPIII or MPRF Interfaces should not be connected simultaneously (an error message will be generated when communications are attempted).

The System Information utility can show what type of Interface(s) are currently connected or which Serial Comm Ports your computer has. This tool may not be available on some computer operating systems.

You are ready to use DataTrace RF. Other Setup features are only optional, and most are self-explanatory.

For details on other Setup items see:

[Display Options](#)

Units of Measure, Number of Decimal Places, Language

[Setup Preferences](#)

Default Program Time, Message Behavior, Sounds

[Setup Radio Options](#)

Alarms, Loss of Communications Behavior, Data Saving Behavior

[Lethality](#)

Type, Parameters, MPRF Real Time Lethality

## How to Program Tracers



Click the Program Button to start the Program Tracers Wizard.

1. Select the Tracer Type you will program.
2. If you will be using MPRF Tracers, choose whether you will use their radio function.  
If using the radio, enter the number of MPRF Tracers you will be using and pick a radio Channel.  
(see [Details](#) for explanation of Channel Selection, Number in Group or Program for Another Host)
3. When finished click Next.

**Program Tracer Wizard**

Program Tracer Type: MP-RF

Select MP-RF Radio Options

☐ No Radio (Logger Only)

☒ Use Radio [Use Radio?](#)

[Choose Tracer Type](#)

Number of Tracers in Group: 4

Channel Number: 5

[If using radio, enter how many and choose a channel](#)

☐ Program for use with a Different Host

[After Selections, click Next](#)

<< Back    Next >>    Program    Cancel

4. Choose the Date and Time you want the Tracers to start logging data. This is normally referred to as the Start Time.
5. Choose how often you want a data point to be logged. This is normally referred to as the Interval or Logging Interval.
6. If you want to use a Run ID, set it or select the option you wish to use. (See also: Run ID Options)
7. Click Next when finished.



**Program Tracer Wizard**

Program Tracer Type: **MP-RF**

**Enter Data Logging Parameters**

**When to start logging**

Start Time: **02/26/2008 11:03**

**Sample Interval**

**30 Seconds**

**How often to log**

☐ Program for Calibration

☒ Enable Run ID Auto-Numbering

☐ Use Tracer's Existing Run ID

**If desired, Enter a Run ID or select a Run ID option.**

Run ID: **DT-00001**

**Auto-Number Options**

Auto-Number Prefix: **DT-**

Auto-Number Length: **5**

Initial Value: **00001**

**When finished, click Next**

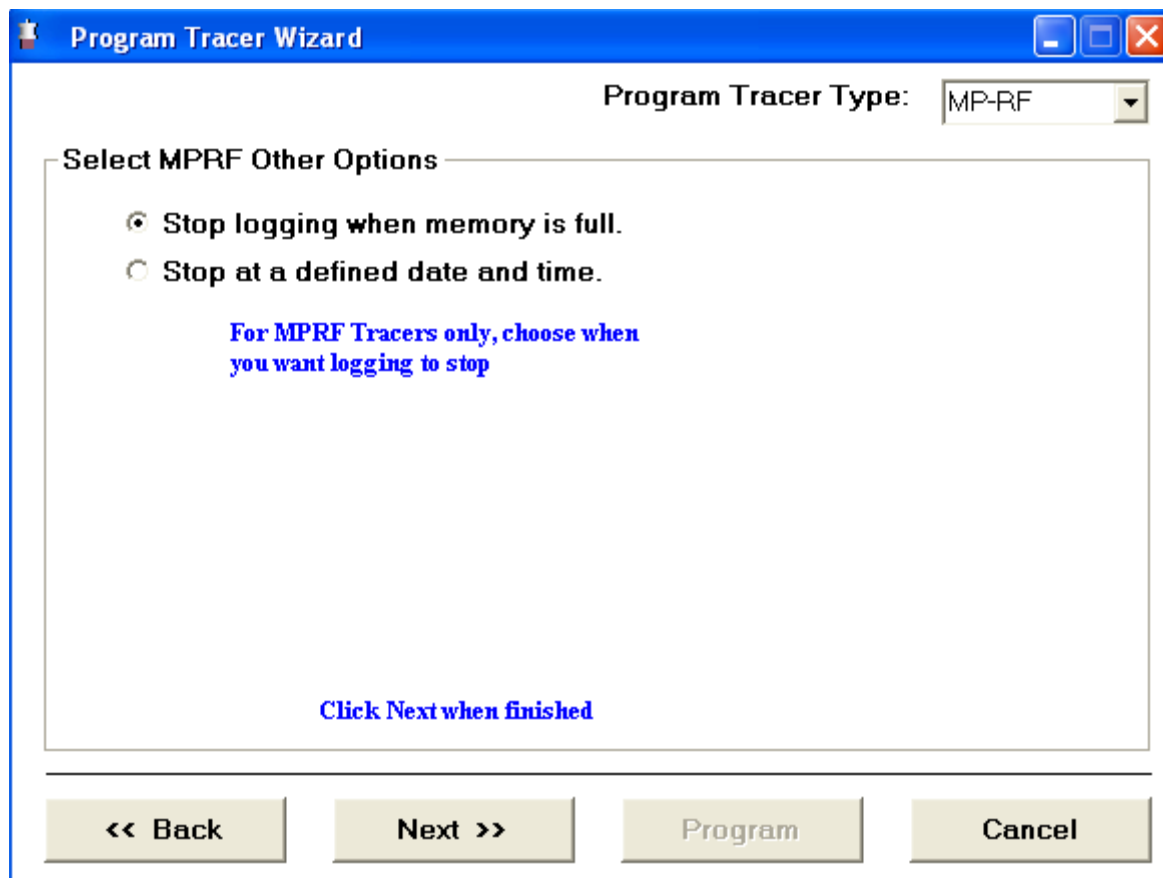
**<< Back** **Next >>** **Program** **Cancel**

The next option applies to MPRF type Tracers only.

8. Choose whether the Tracer will continue to log data until it is stopped, data is read from it (downloaded), or whether it should stop logging data at a particular time.

(MPIII and MPII/FRB models only stop when they are read)

9. Click Next when finished.



10. Place your Tracer in the Interface.
11. If you are programming a large number, you can use Batch Mode.
12. Click Program.
13. When finished, remove the Tracer from the Interface.

**Program Tracer Wizard**

Program Tracer Type: **MP-RF**

**Program Tracers**

Last Unit Programmed

# of Units Programmed

Battery Remaining

Run ID **DT-00001**

Start Time **02/26/2008 11:27**

Interval **00:00:30**

Comment

Batch Mode Programming ☐

**Program List**

**Program your Tracer**

**<< Back** **Next >>** **Program** **Cancel**

*This may be changed as needed; different models may be used simultaneously.*

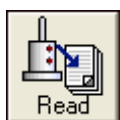
*This is convenient if programming a large number*

Note: The Program Tracer Wizard will not allow changing the start time or interval once one Tracer has been programmed. To do so, you must close the Program window and start over.

See [Program Tracer Details](#) for additional information on such topics as:

- Selecting a Channel for Radio Transmission
- Fast Mode Details
- Programming for Calibration
- Run ID Options
- Batch Mode Programming

## How to Read Tracers




Click the Read button to open the Read Tracers Window.

Depending on the Preferences selected in Setup, the Tracer may be read automatically upon entry into this window.

1. Choose the Tracer Type.
2. If you intend to Read many Tracers, the Batch Read is more convenient.
3. Click the Read Button. Data will be saved automatically once the Tracer has been read.

**Read Tracers**

 [Click here to Read a Tracer](#)

Serial Number

Start Time

Tracer Type  [Choose the Tracer type](#)

☐ Batch Mode Read [This enables automatic reading](#)

**Summary Data** | **Profile Data** | **Graph**

[Choose the view you want](#)

Run ID

Sample Interval

Number of Points

Comment

Data Validation

Battery Remaining

**Summary Data**

Reading Type	Minimum	Maximum	Average	Spread

Total Tracers Read: 0

Before you read a Tracer, or prior to reading any subsequent Tracers, you can change the view from summary to data or graph as desired.

If desired, you may open more than one Read Tracer window and use each one to read a Tracer in order to perform quick comparisons.

Use the Reports functions if you want a tabular report or graph using data from several Tracers at once, or to see previously saved Tracer data.

**See additional information on:**

[How Data is Saved](#)

[Preferences, Copying and Printing](#)

[Using the Graph](#)

[Batch Read Mode](#)

[Lethality](#)

## [Reset and Data Recovery](#)

### [Tracer Calibration](#)

## How to Receive Radio Data

MPRF Tracers must first be configured and programmed for them to transmit data. If this has not been done, see [How to Program Tracers](#)

Radio Data Reception requires a MPRF Host Interface with antenna. For information about the installation of this USB device, see [USB Driver Installation](#)



Click the Radio button to open the Radio Network view.

Once the programmed Start Time arrives (or within a logging Interval) data will arrive.

Serial Number	Channel 1	Channel 2	Run ID	Num & Grp	Comm.
M4T10119	20.469 °C		DT-01	1 ,1009	STD 2/29/201
M4T10134	20.420 °C		DT-02	2 ,1009	STD 2/29/201
M4H10056	23.008 °C	15.4 % RH	DT-03	3 ,1009	STD 2/29/201
M4H10070	22.863 °C	38.2 % RH	DT-04	4 ,1009	STD 2/29/201
M4H10067	22.817 °C	19.1 % RH	DT-05	5 ,1009	STD 2/29/201
M4H10052	22.908 °C	16.0 % RH	DT-06	6 ,1009	LTD 2/29/201
M4H10065	22.807 °C	16.2 % RH	DT-07	7 ,1009	STD 2/29/201
M4H10069	22.801 °C	16.6 % RH	DT-08	8 ,1009	STD 2/29/201
M4H10057	23.060 °C	15.6 % RH	DT-09	9 ,1009	STD 2/29/201

Measured Data will be displayed. You can access a more advanced data view if desired by clicking on the View Data button at the upper right, or using the mouse to select some or all of the Tracers and the right clicking on the grid to bring up the radio options menu.

**Omit from List:** The selected Tracers will not be shown on the right side. Click on the Host (or their parent Repeater) if you want to bring them back into view.

**RF Program Selected Tracers:** The Programming via Radio screen will open, and once

the parameters are defined, the selected Tracers will be programmed. Note: Interval may not be changed in this mode. If you wish to program using a different interval, you must program ALL of the Tracers (right click on the Host icon and select RF Program All).

**See also:**

[Real Time Data Views](#) Information on data display options, summaries, graphs, **saving radio data** and more.

[Radio Function Details](#) Basic radio function descriptions and diagnostic information, using the Network view to Program via Radio, add [Repeaters](#), etc.

[Radio Reception Troubleshooting.](#)

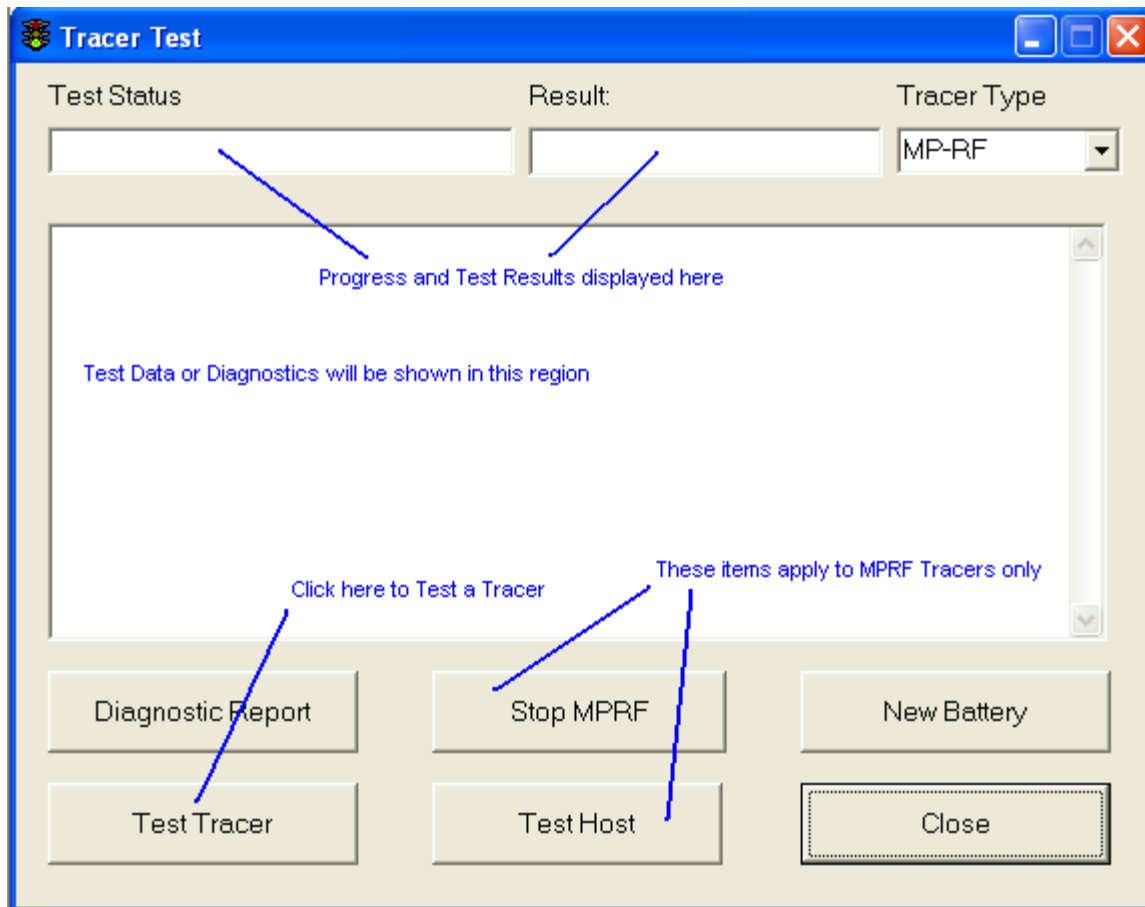
## How to Test a Tracer



Click the Test Trace button to open the Test Tracer window.

Select the type of Tracer you wish to test. The available buttons will change depending on the Selected type.

Place the Tracer in the Interface and click the **Test Tracer** button



The Test Tracer function only tests the standard communications and logging functions. The Tracer will be programmed, allowed to log a few data points and the data will be read back. The measurements of the current ambient conditions are not evaluated but will be displayed.

The radio functions of an MPRF Tracer or MPRF Host are not exercised by these Test routines.

### Diagnostic Report

This function reads the Tracer's configuration and saves it in a file. The file may be viewed or sent to the factory for evaluation or diagnostic purposes.

### **Stop MPRF**

Identifies an MPRF Tracer and commands the Tracer to stop all logging and radio transmissions.

### **Test Host (MPRF only)**

Identifies an MPRF Host and verifies proper communication with the Host / Radio portion of the Interface.

## New Battery

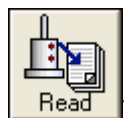
After changing a battery, MPIII and MPRF Tracers require a battery reset procedure. This button will perform that procedure directly. The Test Tracer button will also identify the potential need for the procedure and inquire whether to perform it.

## Calibration

DataTrace RF provide a utility to calibrate Tracer models which support field calibration, which are FRB RH, MPIII Temperature, MPIII RH, MPRF Temperature and MPRF RH.

In order to calibrate Tracers, the Tracers must be programmed and allowed to acquire data at 1 minute intervals. Use the "No Radio" and "Program for Calibration" options when programming them.

Expose the Tracer to a known reference environment. Allow sufficient time for stable readings to be recorded and note the time of stability.



To access the Calibration Utility, open the Read Tracer window and click on the **Calibrate** menu item.


The Calibration procedure allows either 1 or 2 point calibrations. If a 2 point calibration is to be performed, once the Tracer has been allowed to record the stable first reference point, expose the Tracer to the 2nd point and allow the Tracer to stabilize and record the 2nd point.



**Calibrate Tracers**

Calibration Wizard Step 1: Identify Tracer and Calibration Type

Tracer Serial Number  Tracer Type

 Place Tracer in Interface and click 'READ'. Tracer should already contain calibration data (stable Tracer readings at known references acquired at 1 minute intervals).

Select from the options below. Click on 'Next' when finished.

**What to Calibrate**

☒ Temperature

**Calibration Type**

☒ 1 Point  
☐ 2 Points  
☐ Restore Factory Defaults

<< Back      Next >>      Cancel      Finish

Choose the Tracer Type, click the Read button, select what to calibrate and whether it is a one- or two-point calibration. Click Next when these selections have been completed.

**Restore Factory Defaults.** If selected, simply click Finish. The Tracer will be returned to the calibration coefficients of the last factory service.

**Calibrate Tracer M4T10133**

Tracer Calibration Wizard Step 2: Select/Enter Data

First Calibration Pt.

**When the Tracer Reading was:**

Date / Time	Reading
2/25/2008 15:27:00	23.284
2/25/2008 15:27:30	23.364
2/25/2008 15:28:00	23.387
2/25/2008 15:28:30	23.304
2/25/2008 15:29:00	23.283
2/25/2008 15:29:30	23.311
2/25/2008 15:30:00	23.378
2/25/2008 15:30:30	23.437
2/25/2008 15:31:00	23.481
2/25/2008 15:31:30	23.547
2/25/2008 15:32:00	23.615

**It Should Have Been**

Reference Name / Lot #

<< Back      Next >>      Cancel      Finish

Based on the known reference environment and what time the calibration environment became stable, select a data point for the Tracer, and enter what it should have been (the reference value). Do so for both points if a 2 point method was selected (a second grid will be visible). Document the test name or Lot number if desired, and click Next.

Notice: When performing 2 point calibrations, the 2 reference values should be different by at least 20, and the tracer value may not be more than 20 different from the corresponding reference value.

**Calibrate Tracer M4H10067**

Tracer Calibration Wizard Step 3: Results:

Click 'Finish' to Apply the correction before taking the Tracer out of the interface!

First Calibration Pt.	Second Calibration Pt.
<b>Reference Value</b> 99.999	<b>Reference Value</b> 
<b>As Found</b> 96.891	<b>As Found</b> 
<b>Difference</b> -3.108	<b>Difference</b> 
<b>Corrected Value</b> 99.999	<b>Corrected Value</b> 
<b>Factory Value</b> 96.891	<b>Factory Value</b> 

**Comments**

**Operator Name**

Enter Comment and Name for documentation purposes, if desired. Click Finish in order to load the new calibration into the Tracer.

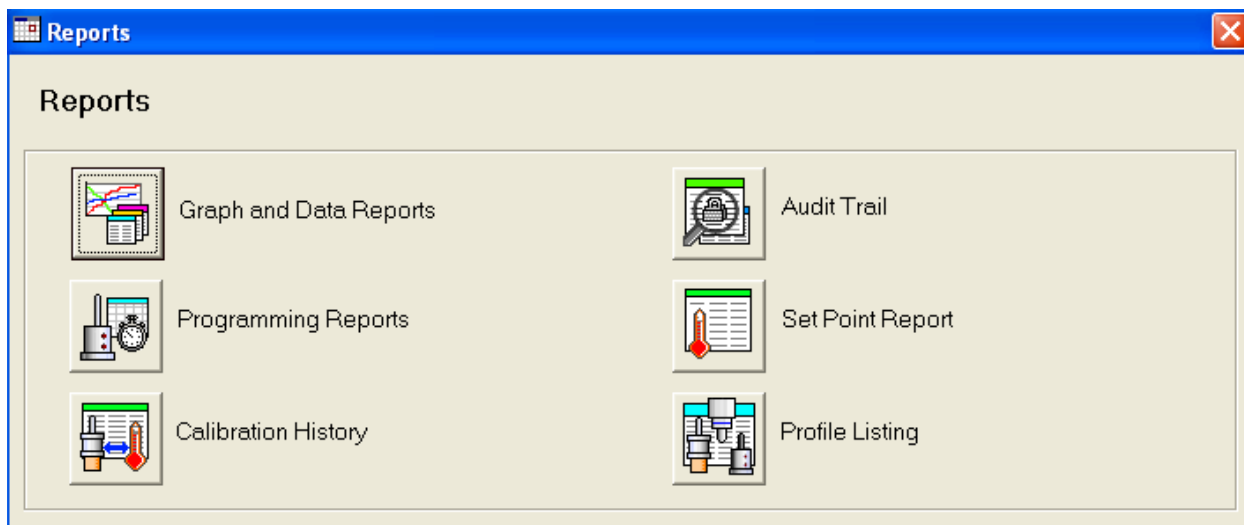
## Reports

In the current revision of DataTrace RF, advanced Reporting are handled externally; namely, since DataTrace RF saves the Tracer data into the DTW 21 CFR 11 compliant database, DTW can provide the necessary Reporting functions.

**Help for DTW Reports is not included in this Help File. Press F1 while looking at the DTW Reports in order to access the DTW Help, or refer to the DTW operator's manual.**



The Reports button will open the Reports Manager.



**Data and Graph Reports:** Generate advanced reports and or graphs for one or more Tracers, includes options for summaries, phase boundaries, limits and thresholds, font and title customizing, etc.

**Programming Reports:** A report indicating which Tracers were programmed for a given start time and date.

**Calibration History:** A report on when Tracers were calibrated and the calibration results.

**Audit Trail:** View system activity and usage.

**Set Point Report:** A report indicating when a set point and a maximum temperature was reached.

**Profile List:** A listing of all available data profiles.

See also: [DataBase Utilities](#)

DataTrace RF does provide some minimal reporting functions:

Summary, Profile or Graph printing or copying is available from the Read Tracer window.

Summary, History, Graph or Spatial View printing or copying is available from the Real Time Radio Data window.

Diagnostic Report, available from within the Test Tracer window

**Notice:** Once data is copied or exported into an alternative application for report generation or other reasons, data security and 21 CFR Part 11 compliance is beyond the control of DataTrace RF or DTW.

The miscellaneous printing functions supported in DataTrace RF do not include the more advanced features available within DTW such as setting phase boundaries, limit or threshold markers, customizing font sizes or titles, etc.

## Database Utilities

In the current revision of DataTrace RF, database utilities such as exporting data or creating backups are handled externally; namely, since DataTrace RF saves the Tracer data into the DTW 21 CFR Part 11 compliant database, DTW provides the necessary utilities.

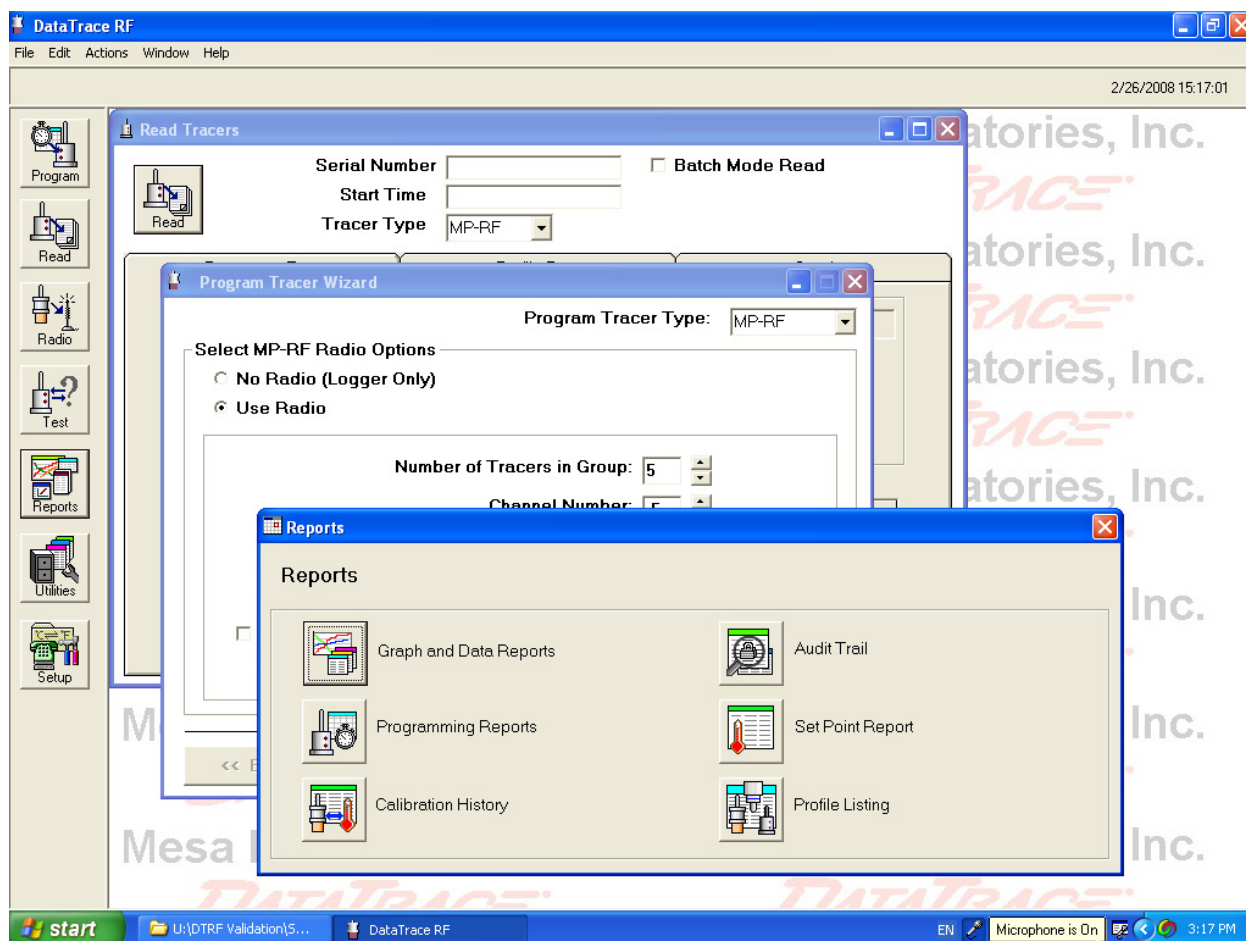
**Help for DTW Utilities is not included in this Help File. Press F1 while looking at the desired utility in order to access the DTW Help, or refer to the DTW operator's manual.**



The Utilities button will open the Database Utilities Manager.

## Main Screen

The DataTrace RF Main screen supports multiple windows. These may be moved and some windows can be resized as desired. The File, Edit, Windows and Help menus contain common entries and functions. Selecting an Actions menu item is the same as clicking on the button of the same description.



## Printing and Copying

Printing and Copying directly from a selected window (not from a Report Generator) within DataTrace RF is context sensitive. What is copied or printed depends not only on the active window, but also on the current view for the active window. Not all screens support copy or print functions. If the screen items are not supported, these menu items will be disabled.

## Help Menu

The Items within the Help menu are also common in nature. Some items require access to the Web or Internet. If this is not available or supported, additional information is available at [www.mesalabs.com](http://www.mesalabs.com)

## System Setup

For Host or Interface Installation see [USB Driver Installation](#)

To define communications connections see [Comm Port Setup](#)

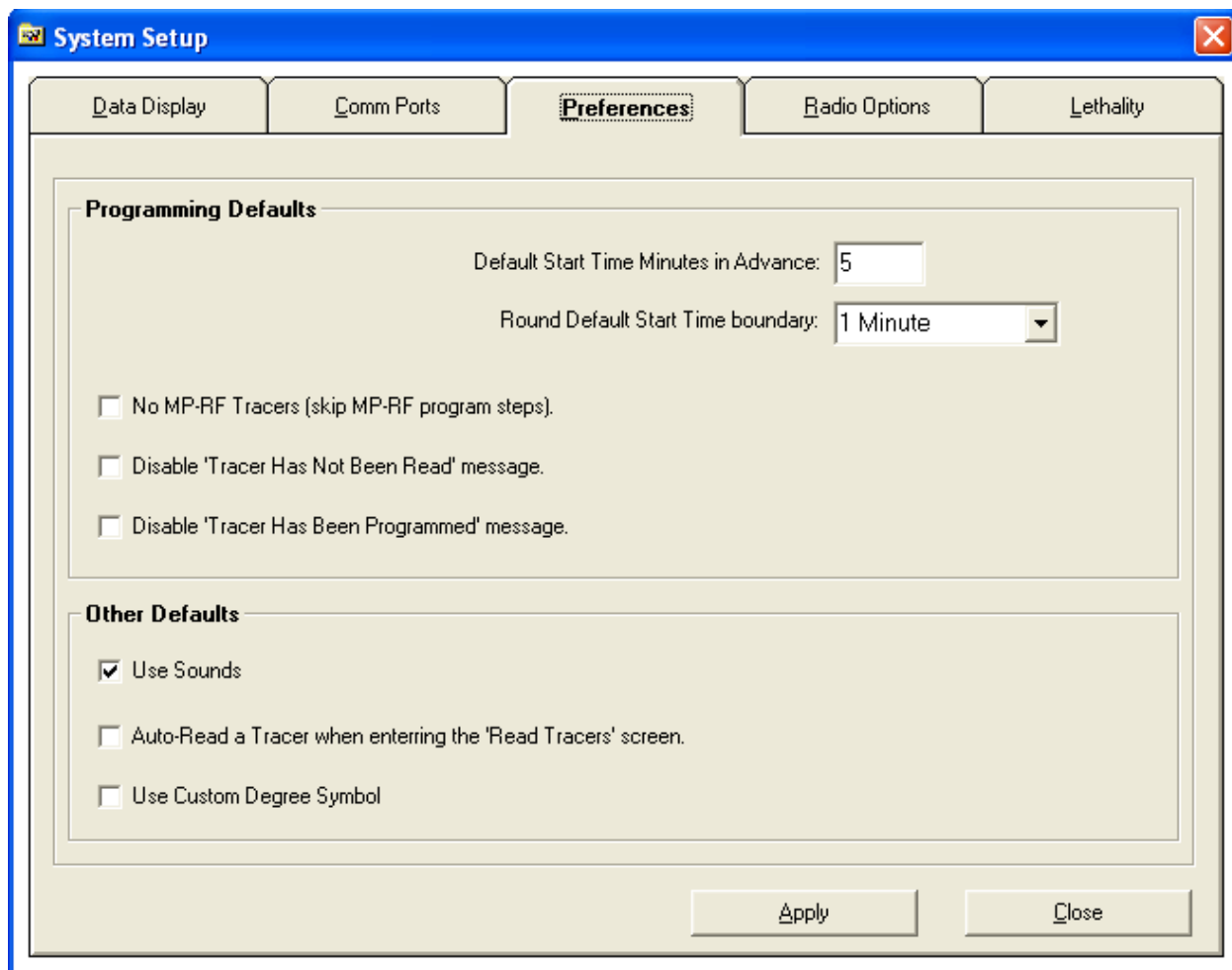


Click the System Setup Button to open the Setup window.

Choose your Language, Units of Measure and the Decimal Places to be displayed for the appropriate parameters.

Note: DataTrace RF uses the computer system settings (Regional and Language settings in your Control panel) for Date and Time display format, as well as for decimal separator symbols.

The Preference settings affect how the software behaves when programming or reading Tracers. These are primarily individual preferences, so set them as you are most comfortable.



The **Default Start Time Minutes** option defines how far in the future data logging will begin when first entering the Program Tracers screen, rounded upward as defined by the **Round Default Start Time boundary** setting. For example, for a boundary setting of 15 minutes, if hh represents the starting hour, the start time is forced to hh:00; or hh:15 or hh:30 or hh:45. While this boundary rounding is only specifically required for the synchronization of MPRF radio communications, it is applied to all Tracer types. If the common data logging interval is more than 1 minute, then the minimum setting for the Start Time Boundary should be the logging interval.

The other items in preferences are self-explanatory.

The Radio Options settings affect how the software behaves when using MPRF Radio Tracers.



The screenshot shows a Windows-style dialog box titled "System Setup". It has five tabs: "Data Display", "Comm Ports", "Preferences", "Radio Options" (which is selected and highlighted with a dashed border), and "Lethality". The "Radio Options" tab contains two main sections. The first section, "Alarm Settings", has four input fields: "High Temperature Limit" set to 125, "Low Temperature Limit" set to 0, "High % RH Limit" set to 90, and "Low % RH Limit" set to 10. The second section, "Radio Comm Fail Behavior", has a label "Clear Data Display after:" followed by a spin box set to 3 and the word "Intervals". Below these sections are three unchecked checkboxes: "Enable real-time RF data source (ODBC access)", "Disable 'Radio Data has not been saved' messages", and "Disable 'Host Interval has been changed' message". At the bottom right are "Apply" and "Close" buttons.

Section	Parameter	Value
Alarm Settings	High Temperature Limit	125
	Low Temperature Limit	0
	High % RH Limit	90
	Low % RH Limit	10
Radio Comm Fail Behavior	Clear Data Display after:	3 Intervals
	Enable real-time RF data source (ODBC access)	<input type="checkbox"/>
Radio Comm Fail Behavior	Disable 'Radio Data has not been saved' messages	<input type="checkbox"/>
	Disable 'Host Interval has been changed' message	<input type="checkbox"/>

The **Alarm Limits** are used in the [Real Time radio data](#) view window.

The **Clear Data Display value** controls when a radio value will be erased after loss of communications.

The [ODBC Data Source](#) provides a method for other applications or process control software to access Real Time Tracer data.

The settings in the Lethality tab control the calculation of the common lethality values Fo, PU or CV.

**System Setup**

**Lethality**

**Lethality Constants \* C**

Tx

Z

Threshold

**Display Options**

☒ None

☐ Fo

☐ PU

☐ CV

☐ Ao

☐ Display in Scientific Notation

**MPRF Tracer Lethality Configuration Utility**

Tx

Z

Threshold

☐ No Radio Transmission

☐ Calculate and Transmit

The bottom portion of this screen applies only to MPRF Tracers, and specifically, only while MPRF Tracers are transmitting data via radio. Since an accurate Lethality calculation requires a contiguous data set, and since radio data can be intermittent at times, in order to get an accurate lethality calculation in real time, the calculation must be performed by the MPRF Tracer itself. The MPRF Lethality utility allows for loading the desired lethality values into the MPRF Tracer.

The Algorithm used by DataTrace RF and DTW for Fo, Pu or CV is:

$$\text{Lethality} = \sum_{1}^{N \text{ minutes}} Z \quad \text{for Temperatures} > \text{Threshold}$$

(Measured Temperature - TX) / Z

DataTrace RF and MPRF Tracers also support Ao calculations (which uses the same type algorithm with a seconds instead of minutes as the time base).

**Notice:** MPRF Tracers and DTW Reports use slightly different degrees of precision when calculating a Lethality value. There may be a small difference when comparing the two

values, but this difference is normally less than the significant figures associated with the Final Lethality value and can therefore be ignored.

## Program Tracer Details

The following information contains details on all programming steps. For a quick Tracer programming overview see [How to Program Tracers](#)

Clicking on the Program Tracer button from the Main tab will launch the Program Tracer Wizard. This wizard consists of four screens which are accessed sequentially by the conventional 'Next' or 'Back' buttons. The 'Next' button will not be enabled until all required information on the current screen has been properly entered; status messages will be displayed for missing or erroneous information.

Of the four screens in the wizard, two are applicable only to MPRF Tracers. If you do not use this type of Tracer, there is an option in the Setup\Preferences to skip the MPRF screens. Any attempt to program an MPRF Tracer when these screens have been skipped will result in an error and require proper completion of all screens.

While DTRF will allow programming of all types of Tracers, the user must select which type is currently being programmed. Select the appropriate type of Tracer from the drop-down list in the upper right corner of the screen. While the Tracer type can be changed at any time during a programming session, we recommend grouping the Tracers by type and program each type in its entirety before proceeding to the next group. (e.g., you may program MPRFs, then change to MPPII and program them with the same parameters).

### Program Wizard Step 1: MPRF Radio Options

For MPRF Tracers you may choose whether or not to use the radio. The radio function is a significant draw on the battery; use the radio function only when it is needed. The radio is not to be used for data acquisition during the calibration procedure.

When the Radio function is enabled, the following Radio Configuration Parameters will be shown:

**Number of Tracers in Group:** Each MPRF Tracer requires a specific time slot for communications, consisting of a 1 second window some number of seconds after the Tracer logs data. This time slot is called Member Number, and DataTrace RF will assign it automatically. The Member Number must be less than the sample interval (in seconds), therefore the Number of Tracers in the Group determines the minimum allowable interval; this minimum interval is displayed. This information is displayed on the second screen of the wizard.

**Channel Number:** This value determines the zigbee channel the radio will operate on. Allowed values are 0 through 14. If there are other zigbee devices in use (which will typi-

cally also have a configurable channel number), it would be preferable to use a different channel.

If there are other MPRF users, or it is desired to keep distinct Groups of MPRF Tracers, each user or Group should use a distinct channel.

If it is desired to have different groups of Tracers operate with a different data logging interval, they must be on separate channels (see below at Interval).

If Repeaters (a type of MPRF that rebroadcasts data) are to be used in this system configuration, a separate channel will also be assigned to it in order to allow longer range.

[More details on Repeaters](#)

**Program for another Host:** Use this selection if the radio receiver Host interface will be a different host than the one that will be used to program the tracers. You will also need to enter the serial number of the host that will receive the radio data.

## Program Wizard Step 2: Start Time and Interval

In the Start Time box enter the Date and Time you want the Tracers to start logging data. Use a date format which matches the **date format** as defined in the Start / Settings / Control Panel / Language and Regional Options of your computer. The **time format** is always 24 hour. (no AM / PM), i.e. 14:30:00 is equivalent to 2:30 PM.

In the Interval drop down box, select how often you want a data point to be logged.

In order to have reliable and low power consumption radio transmissions, the MPRF Tracer radio network must be time synchronized. This means that all MPRF Tracers in use must log data at the same time, even if they were programmed at to start at different times, and therefore all of them must use the same logging interval (or use a different channel). The Start Time must also be a common multiple of the Interval in order to have all Tracers logging simultaneously (for example, three Tracers are programmed to log data at 5 minute intervals, one Tracer is programmed to start at 10:00, the second is programmed to start at 10:25 and the third to start at 11:02; the first two will be in synchronization, but third will not).

While this may seem complicated, DataTrace RF provides methods for simplifying and controlling these requirements:

The limited number of Interval selections.

The Start Time must be a whole minute (i.e. cannot program to Start at 10:00:15).

A warning message when changing MPRF programming to a different interval (can be [disabled in Setup](#))

Provisions to default the Start Time to a proper interval multiple (see [Start Time Boundary in Setup](#))

## Run ID Options

Enter a Run ID to be used for all Tracers.

Keep the Run ID that is in the Tracer already.

Set a Prefix and auto increment the numerical portion (especially useful for placing and localizing radio Tracers).

**Run ID:** If desired, enter a Run Identification, up to 8 characters. It may be the same for all Tracers, or different if desired. The Enable Auto-Numbering option allows automatic assignment of a unique Run ID to each Tracer.

**Fast Mode:** When the number of MPRF Tracers to be programmed is more than the selected Interval in seconds (less 2 seconds), Fast Mode will be used, and a message will be displayed to that effect. Fast mode allows a large group to record and report at fast data rates; however, many functions will not be available when this mode is used. The affected functions include Programming via Radio and dynamic addition of a Tracer or a Repeater to the Group. Since Radio communications reliability is also degraded in Fast Mode, it should only be used when necessary. When Fast mode is used, radio transmission will not begin until the programmed start time.

MPRF Tracers will stop logging data based on the selected option. **The MP II and MP III types do NOT support selecting these options.**

**Stop Logging When Memory is Full:** This option behaves the same as MP II or MP III types, and is dependent on the type and memory capacity of the Tracer (for MPRF, 8000 points for a single channel temperature Tracer, 4000 for dual channel such as RH Tracers).

**Stop at a Defined Date and Time:** Self-explanatory.

## Program Wizard Step 3: Program the Tracer

Review the Start Time and Interval settings. Modify the Run ID if desired. Within the Program Tracers screen the Start Time and Sample Interval may not be changed. Use the 'Back' button to go back and edit these values if desired. Note: After the first Tracer has been programmed, the 'Back' button will not be available, and the Start Time and Interval are fixed for the current programming session.

Place a Tracer in the Interface and verify the selected Tracer type (upper right corner) matches. Click the Program button to apply the settings to the Tracer. Upon successful completion "Last Unit Programmed" will show the serial number of the programmed Tracer. A "Tracer Programmed" message will also be generated to indicate programming success, unless this message was disabled in the system setup preferences. Remove the

Tracer from the Interface and program the next one, if desired. Alternatively, the Tracer type may be modified, and a different type of Tracer programmed.

**Batch Mode Programming:** If this option is selected, a programming loop is initiated when the Program button is clicked, and the Program button label will change to "Stop". Upon successful programming, "Waiting for Next Tracer" will be displayed; remove the Tracer from the Interface and put the next one in; programming will occur automatically. When all Tracers of the selected Tracer type have been programmed, click "Stop".

If you wish to program more Tracers of a different type, select the type and restart batch mode. Tracer type may not be changed while batch mode programming is in progress. Batch mode is also aborted automatically by any communications error; the "Stop" button label will change back to 'Program' and after noting the error and/or taking corrective action, 'Program' must be clicked again to start the programming loop.

If during programming the current time surpasses the program Start Time, programming will no longer be allowed. This condition will be indicated by the color of the Start Time changing to red. Should this occur, Start Time can be incremented in whole Sample Intervals by use of the adjacent 'Increment' button (visible only when this condition exists).

If an attempt is made to program a Tracer which contains data which has not been read or saved, a "Tracer has not been read" warning message will be displayed, unless this message was disabled in the system setup preferences.

At any time the "Program Report" button can be clicked in order to see a listing of the Tracers programmed during the current session.

When all Tracers have been programmed, click the 'Close' button to return to the Main screen.

## **Read Tracer Details**

See [How to Read Tracers](#) for basic instructions.

Click the Read Tracers button from the Main screen to access data retrieval functions. To read a Tracer, place it in the Interface, verify the appropriate Tracer type is selected and click the 'Read' button.

You may have multiple read windows open at once. Tracer Types that use different communications ports can be read simultaneously using the different windows.

Unlike DTW, the Read Tracer's window in DataTrace RF does not possess any functionality for retrieval of previously saved data. Use the Reports button to access previous data.

## **Saving / Data basing the Measurements:**

**When a Tracer is read, the data is saved automatically** - if the data or a portion of it has not already been saved. Due to CFR 21 Part 11 requirements, data may not be par-

tially overwritten or added to an existing profile / record.

Since all or a portion of MPRF Tracer radio received data can be saved manually, a warning message is issued if some portion of the data exists. Other than the inconvenience of this message, a Tracer can be read again if it is desired to quickly review the data again or if there is any doubt whether it had been read.

No data is saved if any portion of the data exists! If you saved MPRF data via Radio, and found that you were missing a few points, you must delete the profile using the DTW utilities, and then read the Tracer. This event will be logged within the Audit Trail in order to comply with regulations.

### **Batch Reading**

When this option is checked, clicking the Read Tracer button initiates a loop where Tracers are continuously identified and read. The Status of the batch read operation will be indicated in the upper right corner, and the number of Tracers read is shown in the lower left corner.

When all Tracer have been read, click the Stop button (formerly the Read button) or close the Read window.

Avoid changing Tracer type or unplugging a USB type Interface while a Batch Read process is active as this may result in system hang ups on some operating systems.

### **Read Preferences:**

When entering the Read Tracers screen, a Tracer may be read automatically if the "Auto-Read on Entry" option was selected in System Setup Preferences, the auto-read will be attempted using the Tracer type last employed by the Read, Program or Test Tracer screens.

When data has been read and saved, a sound will be issued if 'Use Sounds" is selected in the System Setup

### **Views, Print and Copy:**

Three views (tabs) are provided; a Summary view, a Profile view consisting of the data and time it was logged, and a Graph view. Tracers may be read at any time regardless of the selected view. Copy and Print functions in the read screen depend on which view is active, and will copy or generate a Print Preview of the information in the current view.

### **Read Tracer Graph:**

Graph control options are available through the graph menu. This menu will also become visible by right clicking on the graph.

An axis of the graph can be scaled by clicking on the target axis; an inquiry will be generated for the desired lowest and highest axis values.

The graph can also be zoomed by using the mouse to highlight the data range of interest. Restore or un-zoom the graph by selecting the Graph Un-zoom menu item

The Graph within the Read Tracer window does not have all of the features of the Graphs within Radio Data Views or Reports screens.

### **Lethality:**

If a [Lethality calculation](#) is specified in System Setup, the final Lethality value will be shown at the Summary screen; the integrated value (total up to that sample time) will be shown in the Profile view, and the value will also be graphed on the right Y axis.

### **Reset and Data Recovery**

Tracers may on occasion reset during operation. When this occurs the Tracer stops logging data. A Reset may occur due to a low battery, static electricity discharge or excessive mechanical shock. In some cases it is possible to recover the data that had been logged up until the time the reset occurred. How this data is recovered depends on the model of the Tracer.

MPII / FRB and MPRF: If recoverable data exists, it is recovered automatically after notification of the Reset event.

MPIII: Data is recovered only if the user desires to do so; furthermore, the user must specify the data end point (when valid data stops).

In all cases of data recovery, the data is tagged within the audit trail portion of the database to indicate this condition.

### **Data Security**

The level of Data Security used by DataTrace RF is established by the Security settings of the DTW database. These security settings are established at the time of DTW software installation. Refer to the DTW manual or Help file for a full description.

There are three levels of security: "None", "Simple", and "Complete".

**None:** Allows the user or users to access all functions of the program without restriction. It bypasses most of the cryptographic features of the program. The only cryptography employed in this case is the addition an algorithm for data profile security. Most users will find this is appropriate for their activities and does not require additional procedures for the user.

**Simple:** In addition to the security algorithm, requires that the user login in order to access the program. Each user is then assigned one of three possible authorization levels: "Data Only", "Data and Utilities", or "Administrator". These authorization levels allow access only to those function levels of the program that the user has been approved for. This security level does not implement data signing necessary to meet USFDA's 21 CFR Part 11.



**Complete:** Complies with USFDA's 21 CFR Part 11 and, in addition to the password protection provided with "Simple" security, provides for "Electronic Signatures".

When DataTrace RF is started or used, User Name and Password entry will be required if DTW has been installed using the Simple or Complete Security Mode. If Complete Security is Installed, User Name and Password will have to be entered each time a Tracer is Read or MPRF Radio data is saved (this provides the required digital signature).

System Auditing occurs in all security modes even though it is only required by regulations in the "Complete Security" mode. This Audit Trail function generates and maintains an audit trail for certain system events and user activities and stores them in a secure, encrypted table. This table includes: User ID, a date/time stamp, and an action description. The Audit Trail may be viewed from the DTW Utilities. All Entries made into the Audit Trail by DataTrace RF are tagged within the audit file as "DTRF" and are therefore distinguishable from events generated within DTW itself.

When security and the use of Password is enabled, the password will **expire after 15 minutes** of no activity by the user. If the Password expires, The system will be locked and will require re-entry of user name and password before other activities can take place. The system status (Locked or Unlocked) is indicated in the upper left corner if security is enabled. The system can also be locked if desired by clicking on the Lock icon. **A locked system will continue to receive radio data!** A locked system can be shut down without knowledge of the password.

## USB Driver Installation

### DataTrace USB Installation Instructions

The installation of the DataTrace USB Interface Driver is a simple procedure which identifies the USB device to your computer's operating system. The USB driver is included on the DTRF installation CD. Once installed, the Interface can be removed from and reinstalled to any USB port on the computer. The DataTrace RF program will recognize the PC Interface as a known hardware and be ready for communication immediately.

When the MPRF Interface is first plugged in, Windows will identify that new hardware has been connected when the USB cable and PC Interface are plugged into the USB port for the first time. This will trigger the Windows New Hardware Installation wizard.

If you have already tried installation and are having problems see [USB Installation Troubleshooting](#)

### Driver Installation

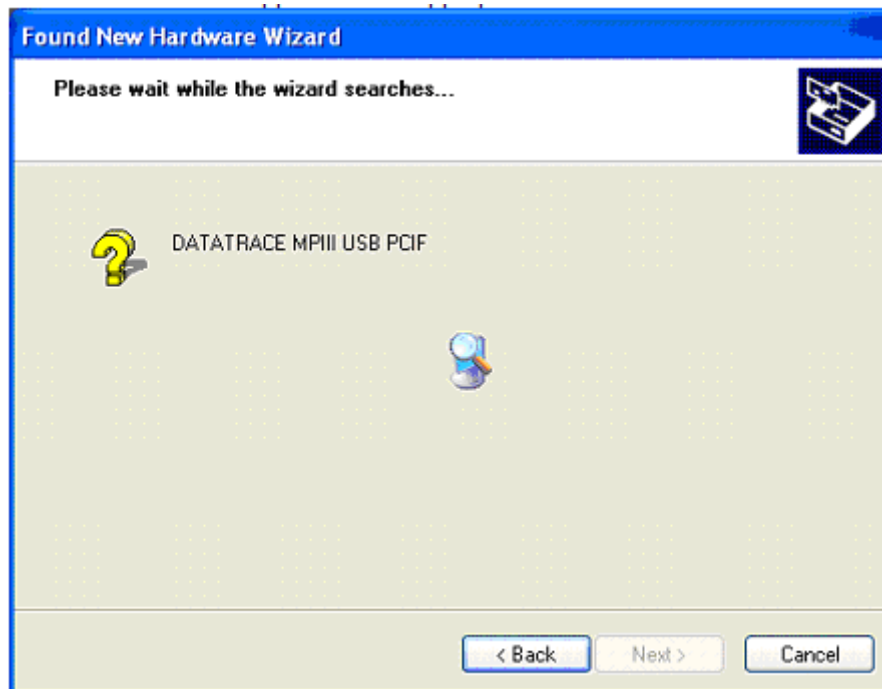
Connect the USB cable to the back of the USB Interface module, and then connect the other end of the cable to an open USB port on your computer. Soon after this connection is made a "balloon" will appear on the bottom right of your screen stating that "New Hardware Found" and identifying it as a "DATATRACE USB PCIF" (may be either MPIII or

MPRF). The following "Found New Hardware Wizard" screen will appear within a few moments:

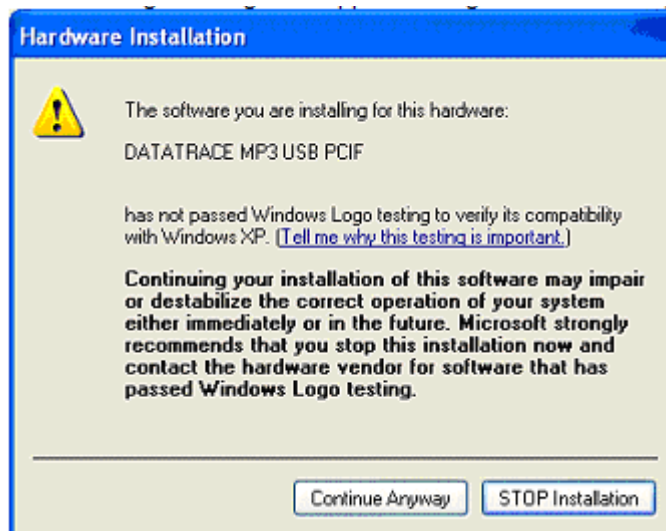


Verify that the CD with the USB Drivers is in the CD drive on your computer.  
Under the "What do you want the wizard to do?" select "Install the software automatically (Recommended)"  
Click "Next".

The next screen will appear as the appropriate files are retrieved and installed from the CD.

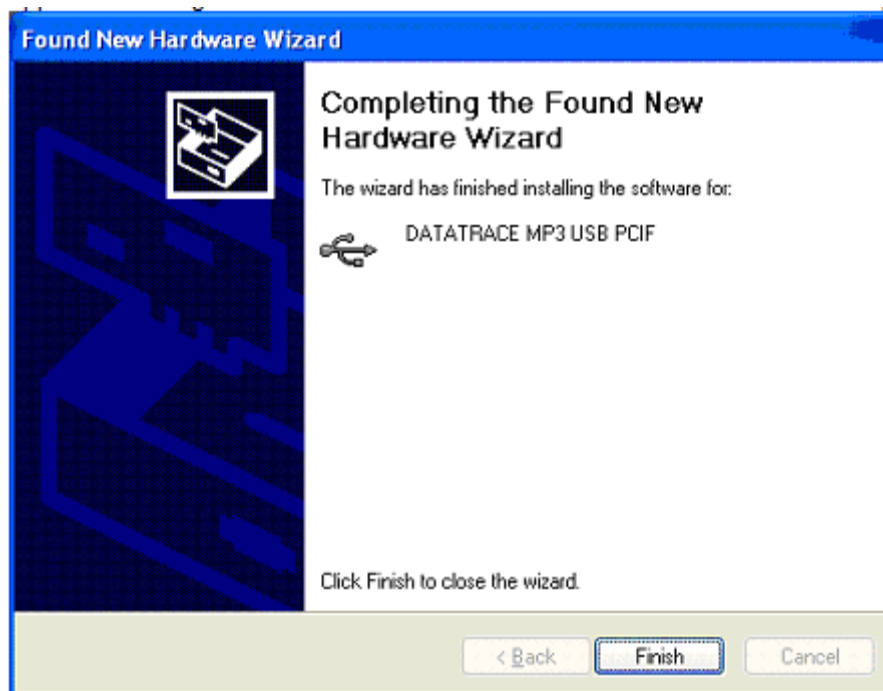


The following message will appear during the installation process. Ignore it by pressing "Continue Anyway" button.



The installation process will continue.

When the files are retrieved and installed, the Next button will become active. Click the Next button and the following screen will appear indicating that the DataTrace USB Interface installation is complete.



Click the Finish button to complete the installation program. You are now ready to use your USB PC Interface.

Congratulations. Now that your DataTrace® hardware is connected to your computer and you have installed the DataTrace® RF program, you are ready to work with your system.

## **Warranty, Patents and Trademarks**

### **NOTICE OF PATENT**

The DataTrace® products herein described and/or aspects thereof as to subject matter of, has patent protection under patent #4,718,776 issued by the U.S. Patent and Trade-mark Office.

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## EXCLUSIVE REMEDIES OF BUYER FOR ANY BREACH BY MESA LABS OF ITS WARRANTIES HEREUNDER.

A. MATERIAL AND WORKMANSHIP: MESA LABS warrants that all equipment manufactured by MESA LABS shall be free from defects in material and workmanship, under normal use and service, for a period of twelve (12) months, except the Tracer batteries and the Humidity Sensors which are warranted for 90 days from date of shipment. If any part of the equipment is returned within this time and found by MESA LABS to be defective in workmanship or material, it will be replaced or repaired, free of charge and returned F.O.B. your plant. Any equipment or part thereof so replaced or repaired shall be warranted by MESA LABS for the remainder of the original warranty period. All replacements or repairs necessitated by inadequate preventative maintenance, or by normal wear and usage, or deterioration under unsuitable environmental conditions shall be at Buyer's expense. Buyer will pay normal DataTrace service charge for evaluation of returned equipment not found to be defective. MESA LABS shall not be obligated to pay any charges incurred by Buyer except as may be agreed upon in writing in advance by MESA LABS.

B. SYSTEM PERFORMANCE: MESA LABS warrants that the DataTrace® System will meet the specifications as defined in the literature and agrees to correct any equipment which Buyer can demonstrate does not meet the applicable specifications, provided written notice is given to MESA LABS within 12 months from date of shipment of the System. Software manufactured by MESA LABS is warranted per the respective software license. This warranty is void in the event of influencing deficiencies, including but not limited to, incomplete or inaccurate process data supplied to MESA LABS by Buyer, and unauthorized modification by Buyer.

C. CHARGES: All dismantling, reinstallation, and the time and expenses of MESA LABS personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer.

LIMITATION OF REMEDY: MESA LABS SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE. THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF CONTRACT SHALL BE LIMITED TO REPAIR OR REPLACEMENT UNDER THE STANDARD WARRANTY CLAUSE. IN NO CASE SHALL MESA LABS' LIABILITY EXCEED THE PRICE TO BUYER OF THE SPECIFIC GOODS MANUFACTURED BY MESA LABS GIVING RISE TO THE CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL MESA LABS' LIABILITY EXTEND TO INCLUDE INCIDENTAL OR CONSEQUENTIAL DAMAGES.

### **Battery Replacement Procedure**

The Field Replaceable Battery for MicroPack Tracers allows the user to change the Lithium battery of the unit without the necessity of sending the Tracer to the factory. This section describes the disassembly, battery installation, and reassembly for the Tracers. While

the procedures for changing the battery are simple and straight forward, adherence to these procedures is necessary to protect the Tracer from damage.

Please note that replacement of the battery does not automatically recalibrate the Tracer. Normal calibration procedures should be instituted to have each Tracer factory calibrated at least once each year or in conformance with your in-house procedures.

### **CAUTION:**

Caution needs to be paid to the handling, storage, and disposal procedures of Lithium batteries. The appropriate procedures are described in this document. Follow these instructions completely. Variations to this procedure could damage the battery, or DataTrace® equipment, and/or cause operator injury. Note carefully the battery warning labels on the batteries or battery trays and disposal of spent batteries must comply with local regulations.

### **NOTE:**

The batteries used in the DataTrace equipment are specially designed for this application. **USE ONLY BATTERIES SUPPLIED BY DataTrace®.** Trying to use any other lithium battery will void the DataTrace® equipment warranty and could damage DataTrace® equipment.

[MPRF Tracer Battery Replacement](#)

[MPIII Tracer Battery Replacement](#)

[FRB Tracer Battery Replacement](#)

### **Radio Details / Network View**

Details on using the Radio Network view to access the Real Time data window are given in [How to Receive Radio Data](#).

Once an MPRF Tracer has been [programmed](#) for radio use, the radio data is transmitted between data acquisitions. Under normal circumstances all MPRF Tracers log data at the same time, but transmit the data at slightly different times. All transmitted data is also logged within the Tracer and can be retrieved through the Read Tracer process. The successful reception of radio data is contingent upon many factors beyond the control of Mesa Laboratories, Inc and DataTrace RF, including constraints such as distance, other interfering radio sources, proper system configuration, walls, floors, and other obstacles, and perhaps most importantly, Faraday's law, which states that radio signals will not travel through conductive materials (e.g. metals).

If an MPRF Tracer is placed in a sealed metal container, there can be very little expecta-

tion of successful radio transmission. However, for ovens, autoclaves, metallic freezers or sterilization chambers there is a good probability of radio communication if there is a non-conductive gasket employed on the door seal, or some non-conductive portion of the enclosure (such as a window) which has at least one dimension longer than 6" (the wavelength of the radio signal). However, conditions such as these may limit the distance of transmission, requiring the Host to be placed relatively close to the Tracers, or using a [Repeater](#). In general, prior to actual use, it is advisable to perform some preliminary testing to verify radio communications feasibility and performance.

While it is common that some radio data will not be received (90% reception is an industry standard), DataTrace RF and the MPRF Tracers have unique features for retrieving missed data. This process occurs automatically, but only when communications are good; getting all data via radio may require the user to place the Tracers near the Host (good communications) to retrieve any missing data points after process completion.

For additional information see [Radio Specifications](#) or [Radio Reception Troubleshooting](#).

**Warning: Radio Data is not automatically Saved**

To save data, open a [Real Time Data](#) view window, see [Saving Radio Data](#) for details.

**Warning:** When saving data to the DTRF database, 21 CFR Part 11 compliance and security issues will not allow any further modifications to the data file, including the addition of new data. Subsequent radio data can therefore no longer be saved to this profile record. When using the DTRF database, it is preferable to acquire all the data desired, then Stop the logging process and save the data. Should it be absolutely necessary to save new data to DTRF, the existing data must be removed using the Delete option in DTRF's Archive Profile function, an action which may also require security clearances (refer to the DTRF manual for details).

## **Network View, Displayed Data**

Note on timing or availability of the displayed information: Each MPRF transmission contains standard information which includes its serial number, data time stamp, the data and miscellaneous parameters. More detailed information such as Tracer Start Time or Run ID is transmitted only when requested. When first viewing the display, the more detailed information may not be immediately available.

In the Radio Network view, along with the actual measurements the following information is available (it may be necessary to scroll the view to the right to see this information):

**Time Stamp:** The date and time the data was measured.

**Tracer Start Time and / or Interval:** The current settings of the Tracer.

**Tracer Reading Number:** The current reading's sequence number. It may be used to determine how soon the Tracer's memory will be full or how much data there is to read.



In addition, six diagnostic items are provided:

**Group ID:** The Group ID is normally the numeric portion of the serial number of the Host receiver. The Host will receive data from any Tracer, but will only acknowledge and transmit instructions to those within its own Group. Only data from the Host's own Group can be logged, saved or graphed.

**Member Number** (discussed at Program Tracers) should be unique for each Tracer. If two Tracers have the same Member Number, their communications efficiency will be greatly diminished. Member number is used determine the delay time after data sampling for transmission.

Problems with Group ID or Member Number are usually caused by different Groups of Tracers being programmed for the same channel or being programmed on one Interface and being received with a different Host (to do this requires using the Advanced Configuration option when programming).

**Elapsed Seconds since Last Data Reception:** in general should not exceed more than a few Sample Intervals.

**Radio dB** is the radio signal strength of the signals received by the Tracer, -20 is strong, -98 is weak.

**Communications Mode** has two states:

**STD** (Standard) for normal radio communications.

**LTD** (Limited) when the communications are not bi-directional; this means that even though data is being received, the Tracer cannot receive any instructions, and some features (e.g. programming via radio or rapid data recovery) are not allowed or available.

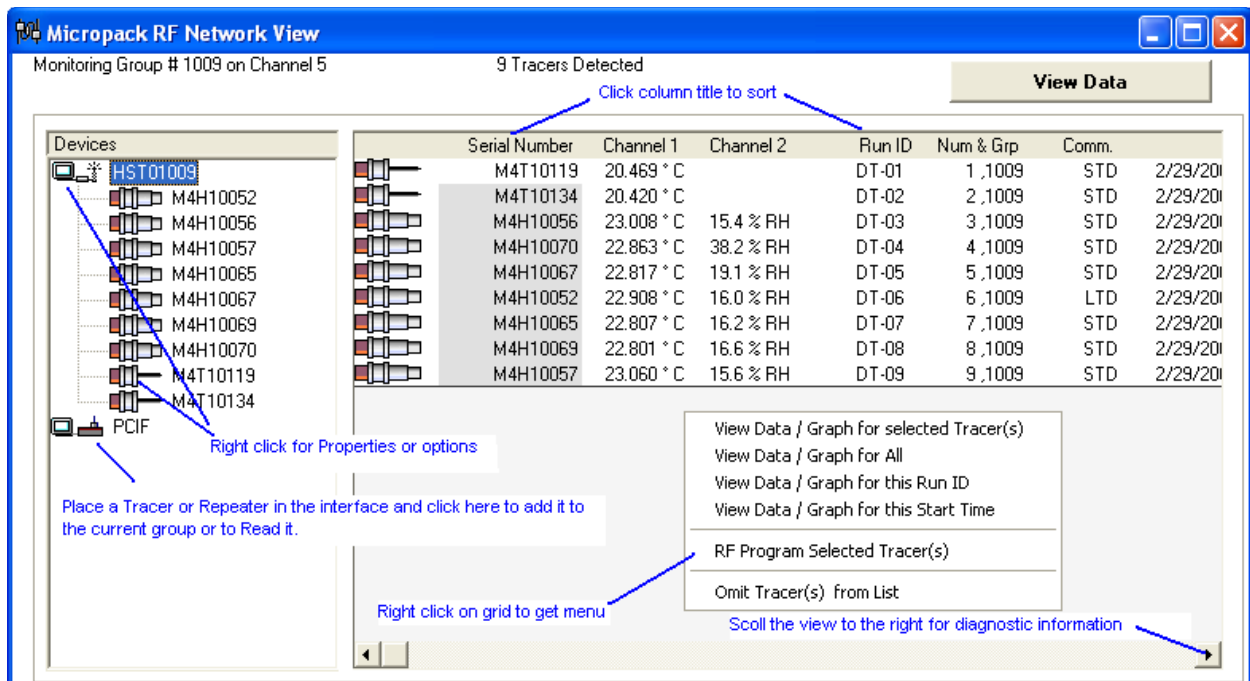
**Battery % Remaining:** An estimate of the Tracer's remaining battery life.

## Network View Functions

The network screen provides methods to control the Tracers via the radio. On the left-side of the screen is displayed the current Tracer network configuration, showing the Host, the Tracers, and any Repeaters which may be in use.

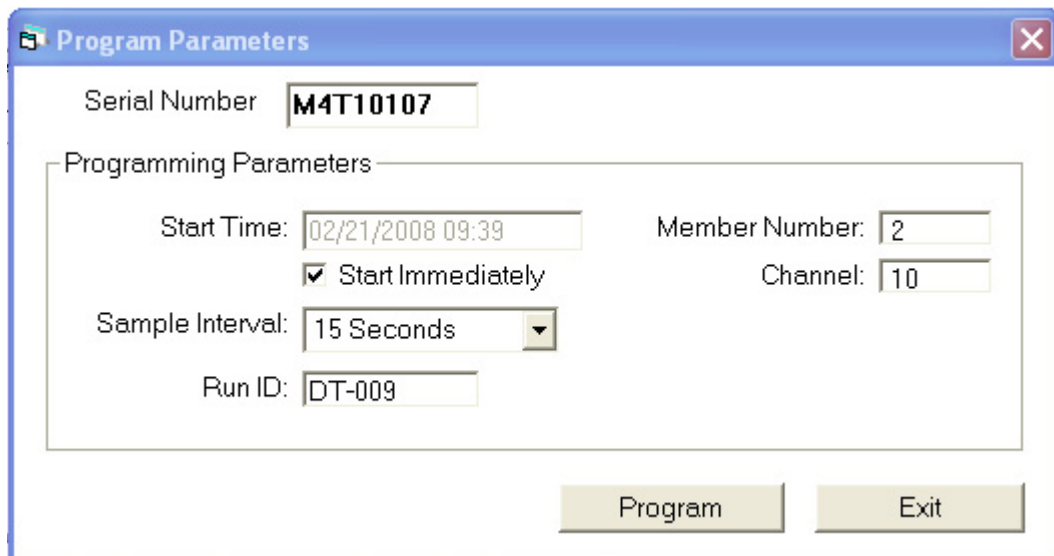
Right Click on the grid to bring up the options menu





The Network view allows the addition or insertion of Repeaters in order to relay data over greater distances. See [Repeaters](#) for details.

**Program via Radio:** MPRF Tracers may be reprogrammed via the radio. Programming via radio does require that communications be bi-directional for all Tracers (DTRF will advise if this condition is not met). **Logged data will be lost - Save any data logged first!**



To reprogram the Tracers, enter the new Start Time and Sample Interval, and click program. DTRF will transmit the new parameters to the Tracers and verify the reception of the command. Programming status will be shown in the network configuration diagram.

After all Tracers have been re-programmed, DTRF will reprogram any Repeaters and the Host automatically. The entire process will normally require 2 to 3 sample interval periods. Upon completion, a message indicating reprogramming is completed will be displayed. It is normal for communications to be interrupted for a few intervals or until the new start time arrives.

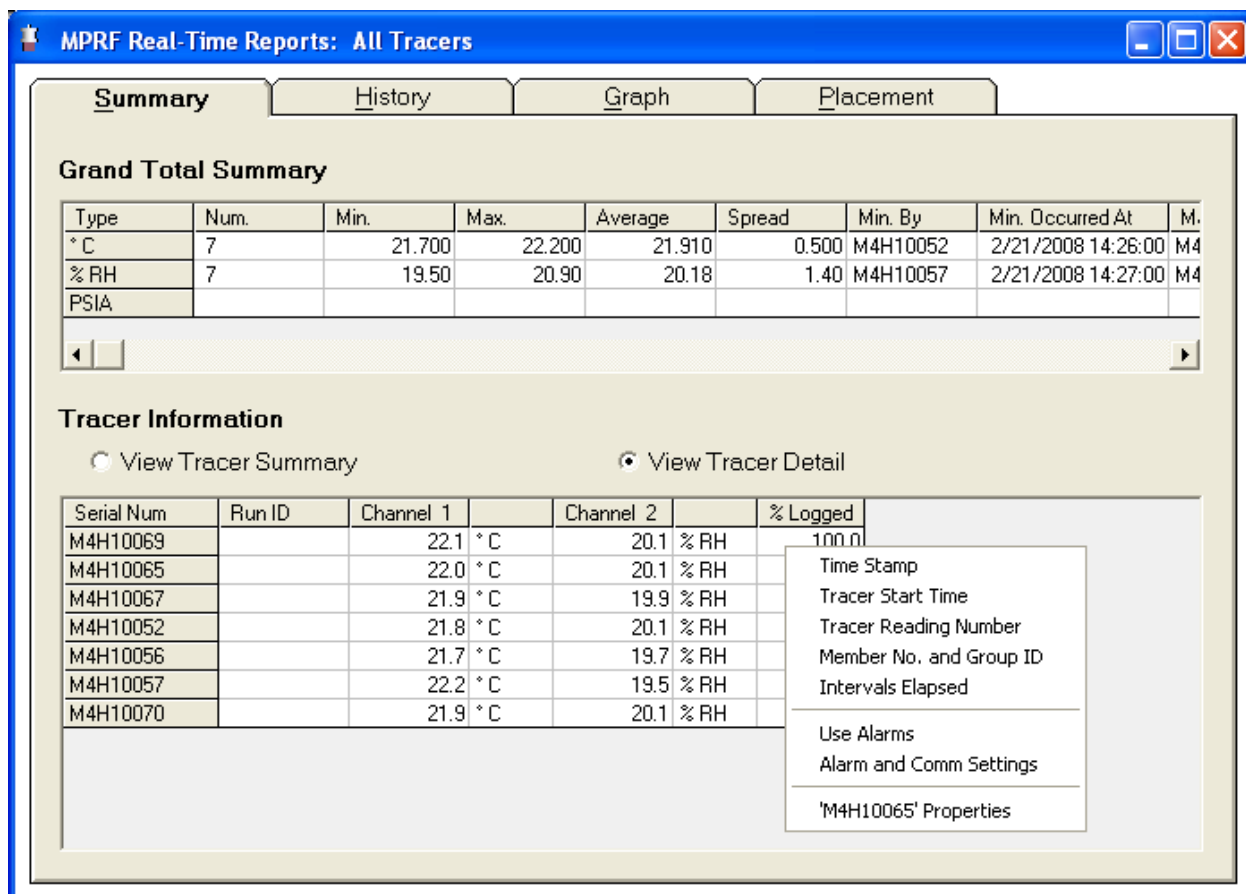
**Note on Changing Sample Interval:** Since radio communications require that all Tracers have the same Interval, changing the Sample Interval is allowed only if all Tracers are selected for re-programming via radio (selection by right click on Host Icon, Program All item).

**Configure Host:** A utility which allows manually setting the Host's channel and Group ID. Intended for advance network control and not normally used.

### **Real Time Data View**

Specialty views of incoming radio data are available on Real Time Data screens. A Real Time view is launched from the [Radio Network view](#) by clicking the top right "View Data" button, or by selecting a Tracer or group of Tracers on the right side of the Network view, and then right clicking on them to bring up the selections menu of options.

The Real Time window starts with a customizable view of the data and a summary for the selected Tracers.



Most options and summary items are self-explanatory. Some clarifications are:  
 All displayed average values are calculated as a Mean Average. The spread values are the difference between Maximum and Minimum values. Summary values are limited to like units of measure. When multiple units of measure are in use, summary values are calculated for each type.  
 Summary values are limited to like units of measure.

### Grand Total Summary

Shows summary information for all the tracers and all the data recieved.

Tracer Information has two options explained below:

### Tracer Summary:

Shows summary information for each tracer

### Tracer Details:

Right click on the grid to customize the view. The options are:

Time Stamp: The date and time the data was logged by the Tracer.

Tracer Start Time The date and time the Tracer started logging data.

Tracer Reading Number: How many data points the Tracer has logged.

Member No. Diagnostic; no two Tracers should have the same Member No.

Group ID Diagnostic; should match the Host's Serial Number (otherwise belongs to a different user).

Intervals Elapsed Diagnostic; how many intervals have passed since the last reception of data.

% Logged How much data has been received since logging started. If not 100% and data is saved, subsequent reports will also contain missing information and averages or lethality calculations may not be accurate.

### **Alarms:**

When the use of Alarms is enabled (indicated by a check mark next to the menu item in the picture above), any values that are higher than the Alarm maximum setting will be displayed in a **Red** color, and any values that are lower than the Alarm minimum setting will be **Blue**. The Alarm Settings menu item allows access to the Maximum and Minimum Limits for Temperature and for Relative Humidity (limits can also be set in the System Setup screen Radio Options).

### **Other Tabs / Views**

[Radio Logged Data History](#)

[Radio Data Graph](#)

[Placement View](#)

[Thermal Map](#)

### **Additional Information**

Saving Radio Data

Troubleshooting Radio Communications

### **Radio Data History View**

The Radio Data History grid provides a view of the radio data that has been received since the DataTrace application was started.

**Warning: This data is not automatically saved!**

**Warning:** When saving data to the database, 21 CFR Part 11 compliance and security issues will not allow any further modifications to the data file, including the addition of new data. Subsequent radio data can therefore no longer be saved to this profile record. It is preferable to acquire all the data desired, then Stop the logging process and save the data. Should it be absolutely necessary to save new data, the existing data must be removed using the Delete option in DTW's Archive Profile function, an action which may also require security clearances.

Right Click on the grid to bring up the options menu

MPRF Real-Time Reports: All Tracers

Summary History Graph Placement

View Data View Summary

Date / Time	M4H10069 °C	M4H10069 % RH	M4H10065 °C	M4H10065 % RH	M4H10067 °C	M4H10067 % RH	M4H10052 °C	M4H10052 % RH
2/21/2008 13:54:30	23.2	18.5	23.2	18.4	23.1	18.2	23.1	
2/21/2008 13:55:00	23.2	18.5	23.2	18.4	23.1	18.2	23.1	
2/21/2008 13:55:30	23.3	18.5	23.2	18.4	23.1	18.2	23.1	
2/21/2008 13:56:00	23.3	18.5	23.2	18.4	23.2	18.2	23.1	
2/21/2008 13:56:30	23.3	18.5	23.2	18.4	23.2	18.2	23.1	
2/21/2008 13:57:00	23.3	18.5	23.2	18.4	23.2	18.2	23.2	
2/21/2008 13:57:30	23.3	18.4	23.2	18.3	23.2	18.0	23.2	
2/21/2008 13:58:00	23.3	18.4	23.2	18.3	23.2	18.1	23.2	
2/21/2008 13:58:30	23.3	18.3	23.2	18.2	23.2			
2/21/2008 13:59:00	23.3	18.2	23.2	18.1	23.2			
2/21/2008 13:59:30	23.3	18.2	23.2	18.1	23.2			
2/21/2008 14:00:00	23.3	18.2	23.2	18.1	23.2			
2/21/2008 14:00:30	23.3	18.2	23.2	18.1	23.2			
2/21/2008 14:01:00	23.2	18.2	23.2	18.0	23.1			
2/21/2008 14:01:30	23.2	18.3	23.1	18.1	23.1			
2/21/2008 14:02:00	23.2	18.2	23.1	18.1	23.1	17.9	23.0	
2/21/2008 14:02:30	23.2	18.2	23.1	18.1	23.0	17.9	23.0	
2/21/2008 14:03:00	23.1	18.2	23.1	18.1	23.0	17.9	22.9	
2/21/2008 14:03:30	23.1	18.2	23.0	18.1	22.9	17.9	22.8	
2/21/2008 14:04:00	23.0	18.3	22.9	18.2	22.8	18.0	22.8	

Save RF Data  
Recover Older Data  
Stop Auto Refresh  
Scroll To Most Recent  
Remove Selected Row(s)  
Restore All Rows

Data will keep being added to the view as it arrives, essentially at 1 new row per logging interval.

Oldest data is at the top, newest data at the bottom; when the **Scroll to Most Recent** menu item is checked, the grid will scroll such that the newest data is always visible; click on the menu item to check or un-check it.

The Data History menu provides means to **Remove Selected Rows** and save the data. The restrictions for removing rows are that the rows may not be in the middle of the data set; only rows at the very beginning or the very end of the data set may be removed, and the resulting data must be contiguous.

If the removed rows include the last row, new data will no longer be added to this view. The graphed data reflects any removed rows. Data from removed rows is not lost, simply open another Real Time window and the data will all be displayed.

The current data set can also be frozen for saving or analysis by the **Stop Auto-Refresh** item. New data will not be added; however, any missing data or blank rows will be filled in if that data is received.

If DataTrace RF Network was accessed after the MPRF Tracers started logging data, the older data may be recovered (downloaded) by using the **Recover Older Data** item. This requires that DataTrace RF has received the Tracer's Start Time and Interval information, which can be seen in the Radio Summary or Network views. Click the Item and enter how far back you want the data, that is, enter a date and time which may not be older than the Tracer's Start Time. Rows for the requested older data will be instantly added to the grid and will begin to fill in with data. Recovered data will arrive at 16 readings per interval for single channel devices and at 8 readings for two channel devices.

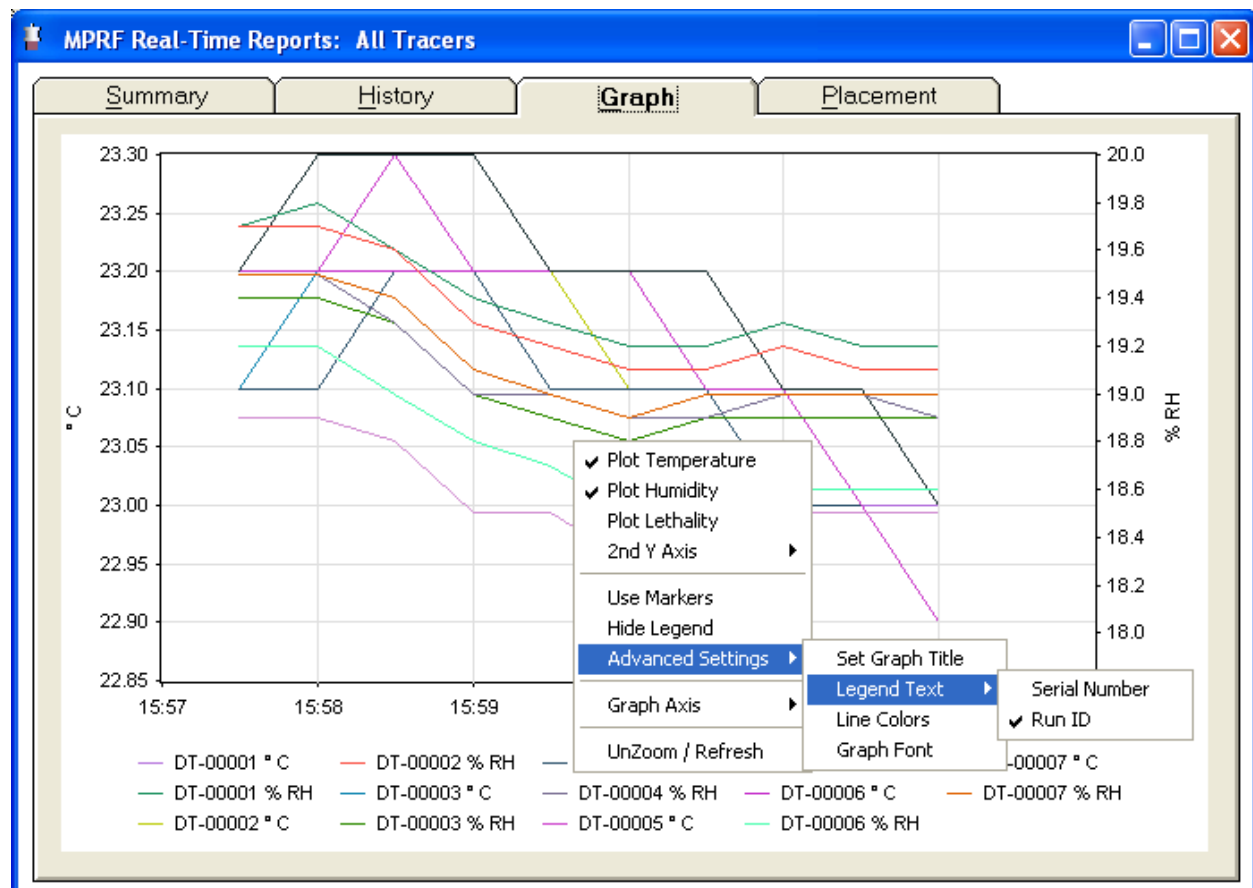
The data in the History grid is what will be saved when **Save RF Data** is selected. All data must be present (saving with missing data is not allowed). The Logged % column in the Summary view also indicates if all data has been received or if there are missing elements.

## Radio Data Graph

Right click on an Axis to set manual or automatic **axis scale** (minimum, maximum) or the use of **grid lines**.

**Zoom** the graph by highlighting the region of interest with the mouse.

Right click on the Graph to bring up the Graph Menu. **Un-Zoom** will restore the graph to automatic scale.



**Plot Temperature, Plot Humidity or Plot Lethality** must be checked for these measurements to be graphed.

Lethality will be graphed only for those MPRF Tracers that were configured for [Lethality Radio Transmission](#)

The items selected (check marked) within the **2nd Y axis** menu will be plotted using the right axis scale. Those not selected will be on the left axis.

The graph is generated from the data within the History view. Any missing data points may be evident in the Graph. The Graph will normally automatically refresh with newly arriving radio data, although there may be at time a lag of an interval or two. New data may not be visible if the graph has been zoomed to an area of older data only.

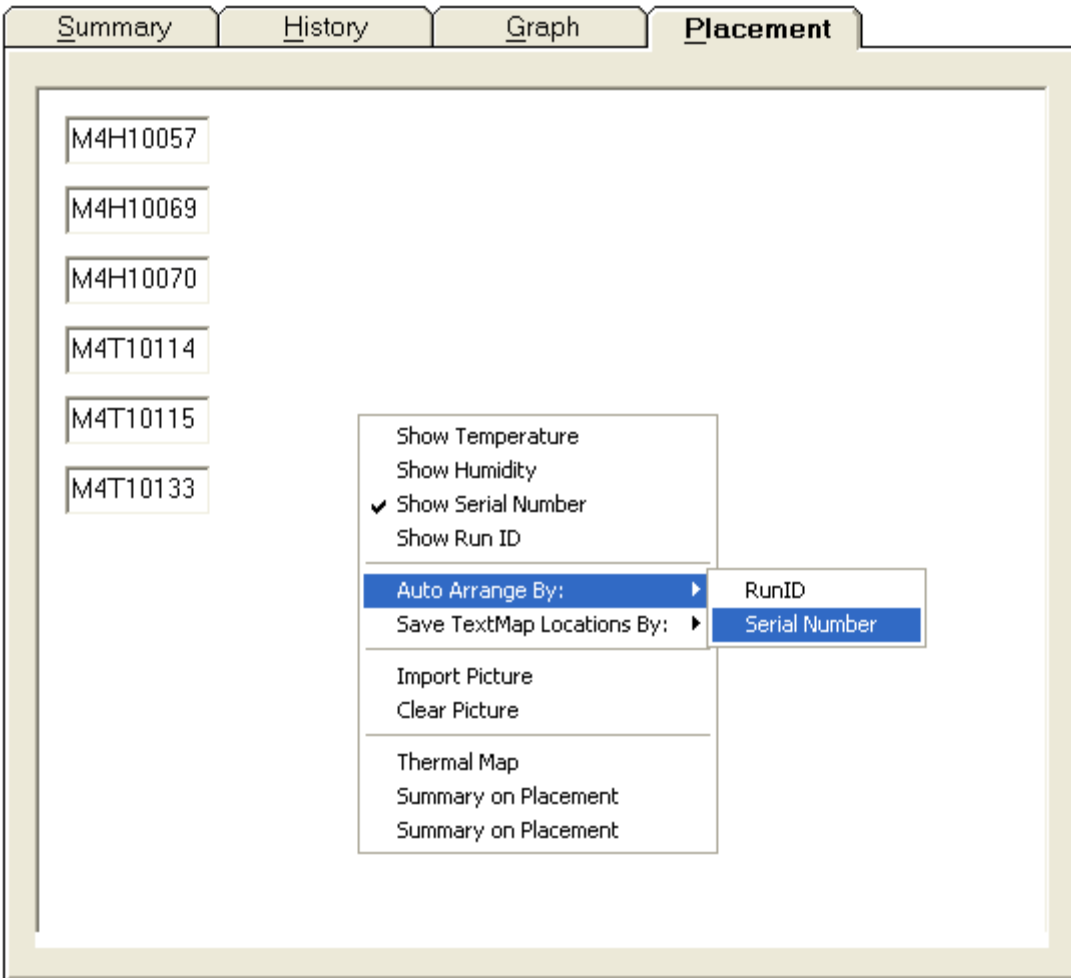
The Graph **Legend** may be hidden or displayed, and may be either the Tracer's Serial Number or the programmed Run ID. Note that the Run ID may not be known for a few intervals when first beginning radio reception.

The remaining items are self-explanatory.

### **[Radio Data Placement View](#)**

The Placement View function is part of and accessed through the [Real Time data window](#)

The Placement View function provides a method for managing, localizing or displaying measurements from a group of Tracers. The displayed information and other settings are accessed from the Placement View options menu, made visible by **right clicking** on the Placement View Area.



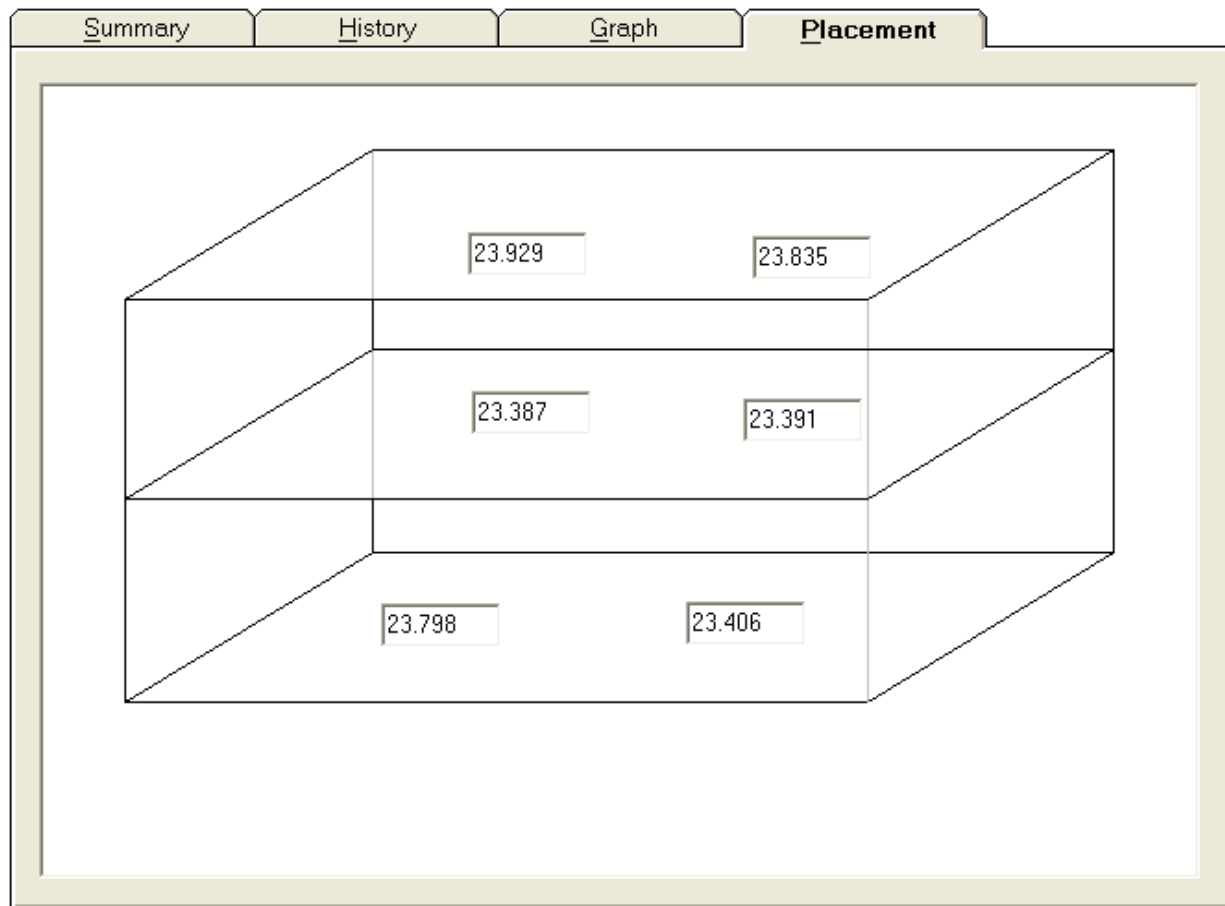
Information from a Tracer is displayed within a text box which may be moved to any desired location by a standard drag / drop operation (hold left mouse button down while moving the mouse, then release at the desired point). The text box can display the Tracer's Serial Number or Run ID during initial positioning, or the Temperature or Humidity measurements. Choose the Auto-Arrange item to initially order the boxes for ease in placement.

In most cases the use of a Placement View requires documentation or knowledge of the physical location of each Tracer. Placement can be simplified by using the Auto-Number Run ID function when programming the MPRF Tracers. The location selected for any text box will be remembered by DataTrace RF based either on the **Save TextMap Location** by Serial Number or the Tracer Run ID setting.

A standard **picture file (e.g. \*.gif, \*.bmp, or \*.jpeg)** may be imported, and the Tracer data displayed on it. A typical picture would be a bitmap drawing of a process area, or a perhaps a digital picture of a auto-clave or freezer undergoing validation. DataTrace RF does not possess any advanced graphics editing or resizing capabilities. Use a Photo Editor or the typical bitmap file editor "Paintbrush.exe" to scale or create pictures of a reasonable



size. A sample file named "3 shelves.bmp" is provided, which can be easily edited and is already an appropriate size. The following picture shows this file with 6 Tracers placed on the picture as a representation of a validation run being performed for an autoclave or freezer with three shelves.



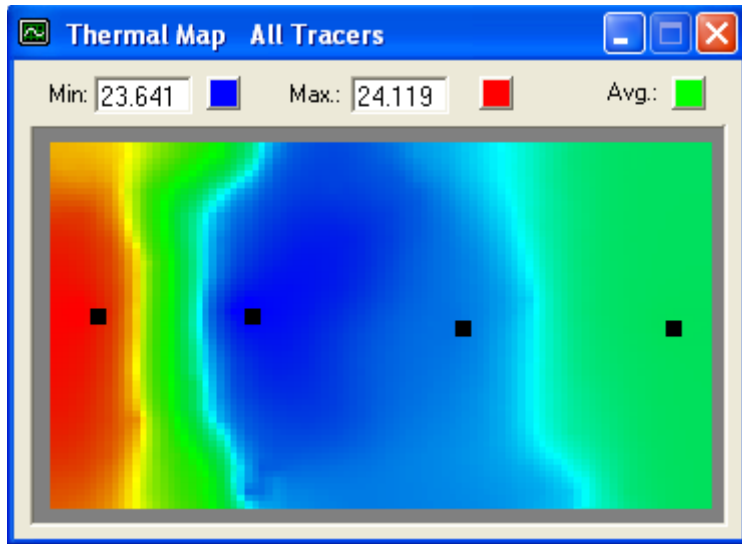
Based on the position of the Tracers, a **Thermal Map** can be generated (e.g. hottest spot is red, coldest spot blue, filled in via interpolation or extrapolation) which can assist in rapidly spotting unexpected measurements or process deviations.

Two spatial views may be used at the same time in order to provide simultaneous spatial displays for Humidity and Temperature.

### Radio Data Thermal Map

The Thermal Map view is accessed from the [Placement View](#) tab of [Real Time Radio data](#) view.

The Thermal Map uses the Placement positioning of the Tracers to generate a color image via interpolation / extrapolation of the Tracer's Data.



Click on the color buttons to customize the **Minimum, Maximum or Average color** to be used.

**Right click** on the Map to bring up the Thermal Map menu which has the following options.

You may edit the Minimum and Maximum values, or you can select **Auto-Scale** to use the group's current minimum and maximum values (note: if Auto-Scale is selected, manually set values will be over-written).

**Auto-Scale to Average** keeps the current span (current difference between Min and Max), but moves Min and Max such that the average color (typically green) is the group's average.

The **Tracer Location** can be plotted (as small black rectangles).

The data interpolation / extrapolation algorithms require significant **computational resources**. It may not be advisable to open more than one Thermal Map simultaneously (resource usage depends on number of Tracers and the speed of the computer operating system).

Moving the location of a Tracer or changing other Placement View settings will cause the Thermal Map to close.

Selecting the Placement, Radio Data or Network views (other windows) may put the Thermal map behind the selected window. The Windows \ Cascade or Tile menu item can be used to restore the view of the Thermal Map.

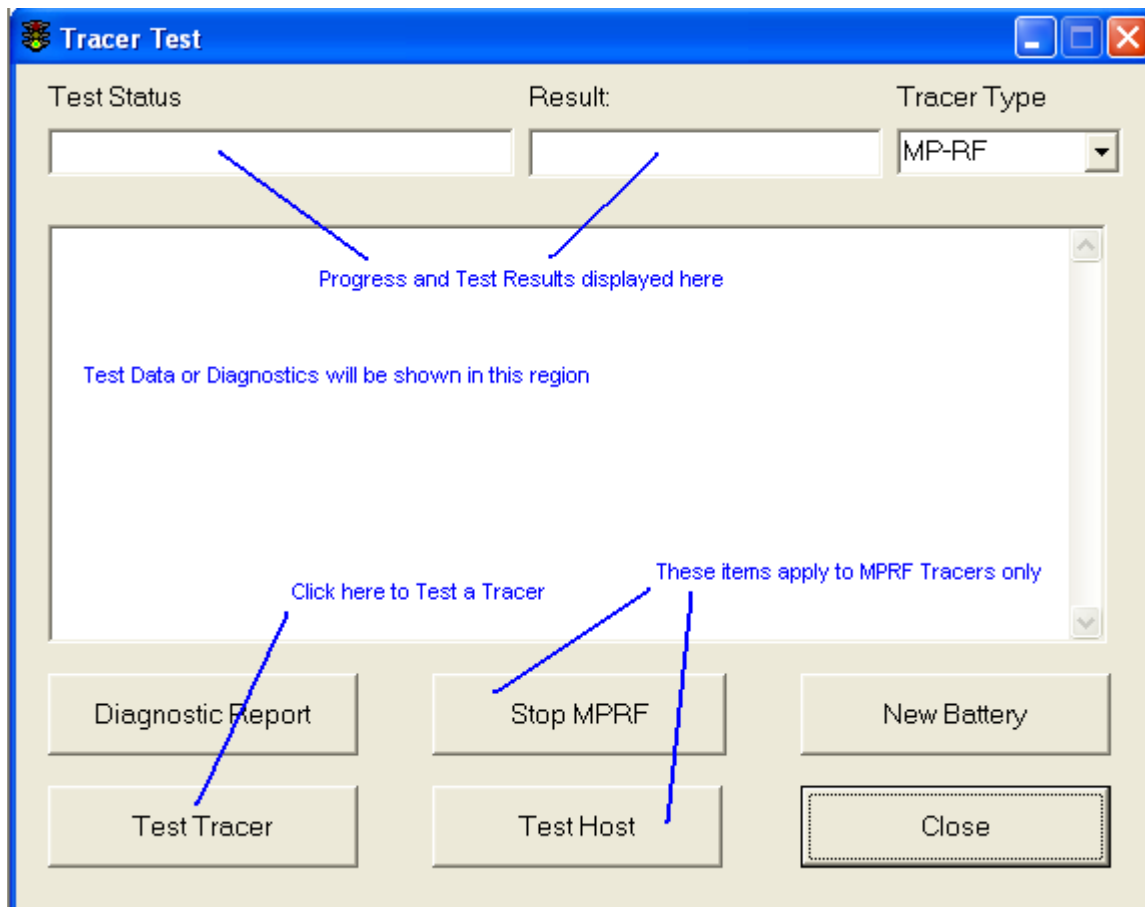
### How to Test a Tracer



Click the Test Trace button to open the Test Tracer window.

Select the type of Tracer you wish to test. The available buttons will change depending on the Selected type.

Place the Tracer in the Interface and click the **Test Tracer** button



The Test Tracer function only tests the standard communications and logging functions. The Tracer will be programmed, allowed to log a few data points and the data will be read back. The measurements of the current ambient conditions are not evaluated but will be displayed.

The radio functions of an MPRF Tracer or MPRF Host are not exercised by these Test routines.

### [Diagnostic Report](#)

This function reads the Tracer's configuration and saves it in a file. The file may be viewed or sent to the factory for evaluation or diagnostic purposes.

### **Stop MPRF**

Identifies an MPRF Tracer and commands the Tracer to stop all logging and radio transmissions.

### **Test Host (MPRF only)**

Identifies an MPRF Host and verifies proper communication with the Host / Radio portion of the Interface.

### **New Battery**

After changing a battery, MPIII and MPRF Tracers require a battery reset procedure. This button will perform that procedure directly. The Test Tracer button will also identify the potential need for the procedure and inquire whether to perform it.

## **Radio Specifications**

The radio transmissions of MPRF Tracers have been tested and are in compliance with [FCC guidelines](#) and regulations. MPRF Tracers use a modified Zigbee protocol in the ISM (Industrial, Scientific and Medical) 2.4GHz band, supporting 15 discrete channels. Transmission protocol is compatible with IEEE Standard 802.15.4.

The radio uses a low noise 1 milli-watt output amplifier. Signal strength is between -20 dB to -98 dB (-20 being a strong signal, -98 dB being a weak signal). Reception dB may be checked as described in [Network View](#)

The radio is intended for short range use; 100 feet unobstructed line of sight. Radio performance may be intermittent or non-existent if the circuit temperature is above 125°C or below -40°C

The FCC certifications for MPRF Tracers require that the Tracer does not transmit if it detects some other transmission in progress. Data transmission by Tracers may therefore be intermittent or non-existent in the presence of other transmitting devices or radio frequency emissions, regardless of the frequency of any interfering emissions. Once the interference ceases, missed data is normally recovered, or can be downloaded from the Tracer by reading it.

## **FCC Statement**

The United States Federal Communications Commission (in 47CFR15.838) has specified that the following notice be brought to the attention of users of the MPRF products.

### **FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT**

"This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to communications. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: 'How to Identify and resolve Radio-TV Interference Problems.' This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4."

Notice: The FCC certifications for MPRF Tracers require that the Tracer does not transmit if it detects some other transmission in progress. Data transmission by Tracers may therefore be intermittent or non-existent in the presence of other transmitting devices or radio frequency emissions, regardless of the frequency of any interfering emissions. Once the interference ceases, missed data is normally recovered, or can be downloaded from the Tracer by reading it.

## **Trouble Shooting**

Select the category which most closely describes your problem:

### [Radio Data Reception Problems](#)

What to do if a MPRF Tracer can be programmed and read, but no radio data is received.

### [Communication Problems](#)

What to do if a Tracer in the Interface cannot be programmed or read.

### [USB Interface Problems](#)

What to do if the Interface doesn't install or function properly, how to Identify the Comm Port #.

### [Tracer Reset Error](#)

Reset normally occurs only after a battery change, what to do if it occurs unexpectedly.

### [Erratic or Inaccurate Data](#)

What to do when the measured values are significantly different than expected.

### [Tracer Diagnostic Report](#)

How to interpret this report.

### [Software Problems](#)

What to check and what information to gather when reporting your problem.

## **Contact Information:**

Mesa Laboratories, Inc  
12100 W. 6th Ave.  
Lakewood, CO 80228 USA

Tel: (303) 987-8000  
Fax: (303) 987-8989  
www.mesalabs.com

## Radio Data Reception Problems

The most common cause for reception problems is that the environment is less than ideal or the transmission distance is too great. See below for details. Diagnostic measurements (radio signal strength and seconds since last communication) can be viewed on the right side of the [Radio Network](#) window.

### Data Is Received but not Logged or Graphed

The reasons for these problems will normally be displayed in the System Comment column (scroll to the far right) of the Radio Network view.

Tracer was programmed for communications with a different Host Receiver; System comment will indicate "Wrong Group".

The Tracer's internal time is wrong. The system will synchronize the Tracer, and once this occurs logging / graphing will be available, and any missed data will usually be retrieved.

The Graph is not set to plot the data type being received (for example, the graph is set to Plot RH only, but only temperature Tracers are in use).

The Graph will not be accessible or plot if less than 3 rows of data have been received in the History log.

Data received via Radio is not automatically saved! If not saved, Graphs and Reports will not be available in the Reports section unless the Tracer or Tracers are read.

### Data Reception is Intermittent

MPRF Tracers are attempting to transmit simultaneously; system comment will indicate "Duplicate Member No." This may occur when Tracers are programmed using a channel on which there already is a group of Tracers transmitting. When this occurs all the Tracers should be re-programmed, and the use of different channels evaluated as a permanent solution.

The Tracers are using Fast Mode; if the number of MPRF Tracers is close to or exceeds the logging interval, the data will be transmitted every other interval (or every third or more

depending on the number of Tracers). This is normal and any missing data points are eventually retrieved.

If some data points are missed, the system will normally retrieve these missed points; however, this can only occur for logged data points (post programmed start time).

Reception may be intermittent when the temperature of the Tracer is changing rapidly or the temperature of the Tracer is greater than 125° C or less than -40° C.

Reception may be intermittent during Print Preview, Printing, Programming or Reading other Tracers. Data is eventually recovered (post programmed start time).

### **No Data is Received**

The Tracers were not programmed for radio transmission. This can also occur if more Tracers are programmed than the Number of Tracers setting in the Program MPRF Radio options screen (the Program Tracer Wizard does issue a warning if this condition occurs).

Normally, Tracers begin transmitting data within two to three intervals after programming. If Fast Mode was used (the number of MPRF Tracers is close to or exceeds the logging interval), the Tracers will not begin transmitting until the programmed start time arrives.

The Tracers were programmed for a different channel than the Host receiver. The reception channel for the host can be seen by right clicking on the Host's icon and selecting "Properties", or can be changed by selecting "Reconfigure Host". Having a wrong channel can happen if there is a communication problem during the insertion or removal of a [Repeater](#).

The Host receiver is not functional. A MPRF Interface consists of two distinct circuits; the Radio circuit and the IR (infra-red) communications circuit. The ability to program or read Tracers is not an indication that the radio circuit is working. In the Test window, the "Test Host" function checks that the Radio circuit is communicating, but does not check that the radio Receiver is actually functional.

The [communications port](#) for the MPRF Interface is not properly set or the [USB Interface](#) drivers are not properly installed

The MPRF Tracer (or a Repeater) has reset, which can be confirmed by performing a Test Tracer. The Tracer may need a new battery.

The MPRF Tracer is too close to the Host Receiver (or is in the Interface). When checking radio communications, the two devices should be at least 6 inches apart (approximately one wavelength).

### **Environment and Distance**

The radio is specified to transmit data at least 100 feet line-of-sight. Intervening walls, machinery or other obstructions will reduce the distance data can be transmitted.

Radio will not go through metals (Faraday's Law). Transmission of data from a metal chamber, oven, autoclave or freezer requires there be some non-metallic path for the radio. A rubber door gasket is usually sufficient, but the signal will be significantly attenuated (weakened). It may be necessary to place the Host receiver or a Repeater quite close to this door (or radio path).

The Tracer's radio network is tolerant of other devices using the same frequency or channel; however, performance may improve by using a channel that is clear.

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### **Communication Problems**

The following information pertains to communications with the Tracer using the Interface. To troubleshoot radio related issues, see [Radio Data Reception Troubleshooting](#)

#### **No communication using the Interface at all.**

A problem with the Interface, computer, or the system setup is indicated.

The Tracer Type is not set right. In the Program, Read or Test windows the type of Tracer (MPRF, MPIII or MPII/FRB) must be set to match the device being processed

The Comm Ports are not set properly. Check this in the Setup window at the Comm Ports tab. It must be set for each type of Tracer. Use the System Information tool to verify which Comm Ports are available.

Avoid using a MPIII or MPRF Interface in direct sunlight or other a bright light as this can cause IR (infra-red) interference and lead to communications problems.

The USB Interface was not properly installed. See [USB Interface Troubleshooting](#).

A computer operating system problem can occur where the PC has lost its recognition of



a USB device. With all of the DTRF windows closed, try unplugging the Interface and then plug it back in.

A MP11/FRB Interface may need to have its battery changed. Older MP11 serial (DB-9 connector) Interfaces may require 10 to 20 seconds "charging" before use.

### **No communication with one or some Tracers, others communicate as expected**

A problem with the Tracer is indicated.

Communications for MPRF and MP11 Tracers are optical. Any stickers or markings placed on the Tracer body may obstruct the communications. The Tracer and/or Interface may need to be cleaned. MP11/FRB Tracers must also be clean in order to make good electrical contact with their style Interface

The Tracer is hot, or, the Tracer is cooling too rapidly. It is good practice to allow the Tracer's body to equilibrate to room temperature before attempting to read it.

The Tracer Battery may be dead or too weak to communicate. Try replacing it ([Battery Replacement Procedures](#)). Note: The battery gauge is only an estimate! See [Battery Gauge](#) for details.

Inspect the inside of the Tracer. If fluid or corrosion is observable, the Tracer will require factory service.

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### **Erratic or Inaccurate Data**

Gross temperature measurement errors are usually indicative of hardware failure and will require factory service for the Tracer. Relative Humidity measurement error can commonly be corrected in the field (if the temperature measurement is functioning properly). Small accuracy problems can be corrected by field calibration if desired and if the Tracer model supports [field calibration](#).

Any evaluation of Tracer accuracy should take into account the response time of the Tracer, the accuracy of the reference measurement the Tracer will be compared to, the stabil-

ity of the reference environment, and the Tracer's specified operating range.

### **Common causes for % RH measurement error**

The RH sensor is loose or making intermittent contact; it should fit snugly. If it is loose, remove the sensor, use needle nose pliers or tweezers to put a small bend (about 30° angle) in the legs of the sensor and re-insert it.

The RH sensor was exposed to a condensing environment. Allow the sensor to dry off. Use the Test Tracer function to confirm good measurements prior to process use.

The RH sensor has been damaged by repetitive exposure to a corrosive environment such as Ethylene Oxide. When a Tracer is used for RH monitoring during EO sterilization, the RH sensor may need to be replaced annually or even more frequently.

The %RH is less than 25 %; the lower limit for an RH MP11 / FRB Tracer is 25 %.

Relative Humidity is dependent on temperature. When the temperature is changing rapidly, there can be significant difference between the RH inside the Tracer's protective cover and the outside environment because of the lag in temperature.

An inaccurate or unstable RH reference was used during a field calibration.

### **Common causes for Temperature measurement error**

The temperature sensor or other Tracer hardware is damaged and will require factory service.

An inaccurate or unstable reference was used during a field calibration.

### **Missing Data**

With some types of Tracers a hardware problem can occur which causes the Tracer's clock to stop. This condition is noticeable when there are fewer data points logged than expected or as compared with other Tracers that were in the same process, and usually occurs at high temperatures. Common causes are:

The Tracer hardware is damaged and requires factory service.

The Tracer body was exposed to a temperature greater than 140° C.

The Tracer's battery is low (see [Battery Gauge](#) for details), occurs mostly with MP111 Pressure Tracers.

### **MP111 Pressure Inaccurate Data**

Some MP111 Pressure Tracers will measure pressure inaccurately when the battery is very

low or weak. The probability of this problem occurring increases when using very rapid logging rates (<10 seconds). The magnitude of the error is typically 5 to 10 PSIA.

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### Tracer Reset Problems

A Tracer Reset condition occurs when power to the Tracer Circuit is interrupted, the Tracer battery is too weak to perform the required function(s), the circuit or sensor is damaged, or more rarely, may occur due to an electrostatic discharge event. If a Tracer is logging data and a reset occurs, it will stop logging, and when read, data can only be recovered up to the point the reset occurred.

#### Common causes for a Tracer Reset:

Changing a battery, or simply removing the battery cover.

The battery springs (MP111) are missing, contact to battery is intermittent.

The battery contacts are corroded, usually quite noticeable by visual inspection.

The battery is actually lower than the battery gauge indicates, the **battery gauge is only an estimate**; the logging interval may be too fast given the environment; see [Battery Gauge](#) for details.

The Tracer circuit is damaged and consuming too much energy. This condition may be inferred if it is possible to read Tracer data and erratic or anomalous data is observed; indicating a sensor short circuit (with consequent excessive battery depletion).

The battery contacts or circuit have been damaged by use of a non-approved battery, improper battery installation, mechanical shock or other physical damage; when a Tracer is shaken, there should be no rattling noise apparent (indicating intermittent battery contact).

While all Tracer designs undergo ESD (Electro-Static Discharge) testing and performance certification, a static electricity spark may on occasion cause a reset.

The Tracer was programmed to transmit radio data while exposed to ultra-low temperatures (less than -40° C). At very low temperatures the battery might not be capable of pro-

viding sufficient energy for radio operation.

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### **Reporting Software Problems**

In the event of unresolved problems with the DataTrace RF Software, please feel free to contact us. Having the following information can be helpful or may be requested:

Description of the Problem.  
Window or screen at which the problem occurs.  
DTRF Software Revision (Help menu > About).  
Tracer Type(s) in use.  
Computer Type.  
Computer Operating System.

Depending on the problem, a Tracer Diagnostic Report may be needed.

Depending on the problem, the contents of the ErrLog.TXT file located in DTRF's working directory (Typ. C:\Program Files\DataTrace RF) may be needed.

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### **Tracer Diagnostic Report**

The Tracer Diagnostic Report button (in the Test Tracer window) reads a Tracer and creates a record of the configuration and calibration parameters in the Tracer. This information is saved in a text file. On occasion, factory personnel may request this file for diagnostic purposes or other analysis.

A complete description of the information saved is beyond the scope of the Help file.

### **Memory Back-Up for MPRF and MPIII Tracers.**

When a Tracer Diagnostic Report is performed on a MPRF or MPIII Tracer, a "Tracer Memory" menu item will become available.

The Items in this menu allow the Tracer's memory (current configuration and calibration settings) to be backed up, or to restore the Tracer from a previously created Back-Up. Restoring from the Back-Up can correct configuration or memory corruptions, also known as "Header Corruptions". The restoration may also occur automatically during a Test Tracer procedure if a corrupted condition is detected.

When performing a manual restoration, it is advised to run the Tracer Diagnostic Report both before and after the restoration, and to always test and check the calibration of the Tracer after Restoring it's memory.

Restoring memory on a MPRF Tracer may also change it's on-board [Lethality](#) calculation constants.

MPRF and MPIII Tracer's are shipped from the factory with the Back-Up in place.

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### **Battery Guage**

This information applies to MPIII and MPRF Tracers, and may be applicable when diagnosing Tracer Reset or communications problems.

**Notice: The battery usage display is an estimate only!** The chemistry of the lithium batteries used by Tracers is such that an accurate battery % remaining cannot be directly measured or inferred from a battery voltage measurement.

The estimate of Battery % remaining is based on the date the battery was installed, how many measurements have been made and how many communication events have occurred. This information is stored within the Tracers. Using this information an approximation can be made as to how much energy has been removed from the battery and how much energy remains.

When a new battery is installed, the reset event is detected and the user will be asked if a new battery was installed. Answering "Yes" causes a new battery date to be uploaded to the Tracer and the number of measurements and communication events are reset to zero.

If the original battery is re-installed, and the battery information is reset as if new, the battery gauge will erroneously indicate a full battery. Likewise, should an unexpected reset occur (e.g. from a static spark), one should not answer "Yes" to the new battery inquiry.

### **Battery Gauge Inaccuracies:**

Other than inadvertently resetting the battery information, the battery gauge may not be accurate due to the way the Tracer is used or the environment it is used in. The approximation algorithms do make some allowances for the following effects, but in some cases battery gauge inaccuracy can be significant.

Battery performance is significantly degraded at low temperatures. While the gauge may in fact be accurate, at very low temperatures the ability of the battery to provide energy rapidly is degraded. If the Tracer is used with a short interval (typically less than 10 or 15 seconds), the Tracer's demand may exceed the battery's ability to supply energy and a Reset will occur. This applies especially to MPRF Tracers performing a Radio Transmission at very low temperatures (less than -40° C); In such conditions it is advised to limit the MPRF Tracer interval to 1 minute or greater.

The Tracer circuit uses more energy at high temperatures, even during storage. This problem is also aggravated by usage with fast logging intervals, and may be especially noticeable in MPIII Pressure type Tracers used at greater than 125°C (at rapid logging intervals).

If it is observed that Tracer Reset problems are usually corrected by the use of a new battery, then it may be necessary to take the above effect into account, establish a typical battery threshold and replace batteries when the gauge indicates the established threshold.

**Note:** The need to replace batteries more often than indicated could also be a problem in the circuitry of the Tracer, especially if the replacement rate is excessive, for example, needing to replace batteries while the gauge indicates 80 % remaining would most likely be caused by a hardware problem.

## **USB Interface Troubleshooting**

The following pictures are from a Windows XP system. There may be some differences when using other operating systems.

If the Device is an MPRF Host Interface, and a Tracer can be properly tested and communicated with, but the problem is that the Host will not initiate, allow configuration or receive radio data, the problem is not with driver installation and it is most likely the hardware is damaged.

Communications may be improved by cleaning the clear acrylic tube the Tracers sit in; wipe with a dry or slightly damp soft paper or cloth. Do NOT get the inside of the Interface wet!

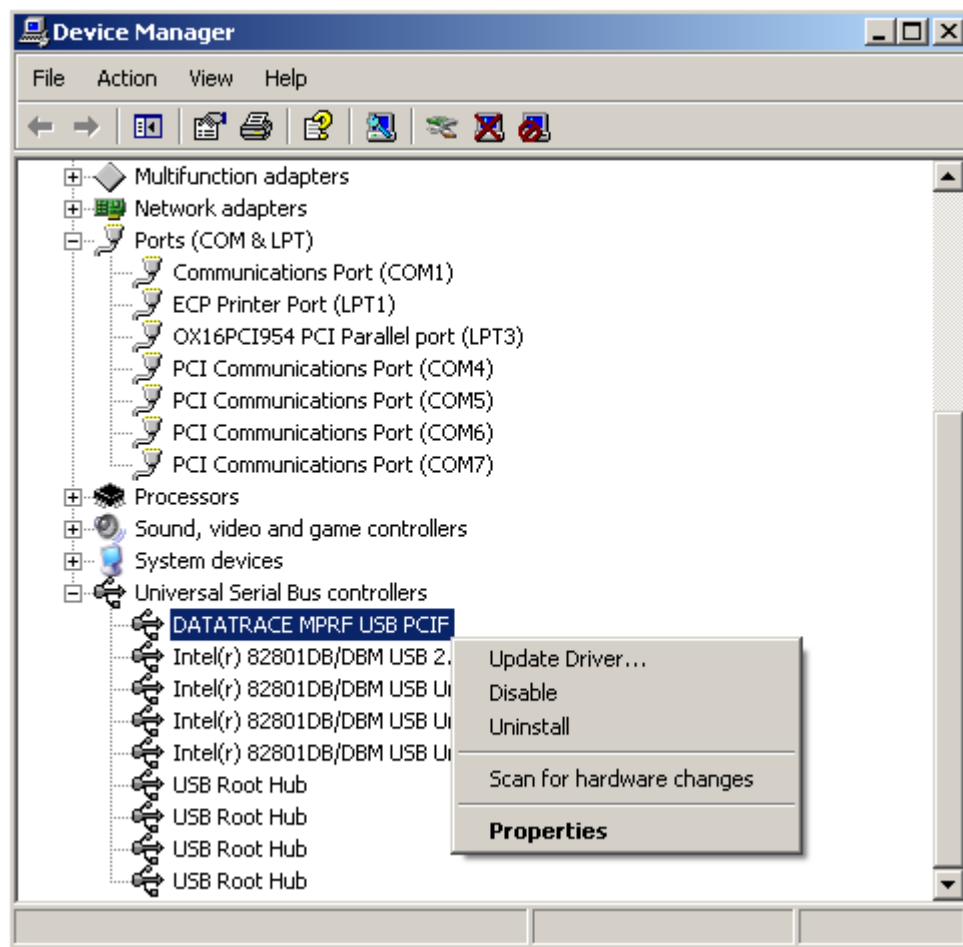
In some cases communications may be achieved by turning the Tracer within the Interface. If this procedure corrects the communication difficulties, a portion of the IR communications transmitter or receiver circuit is damaged and should be repaired at the factory.

### Check the USB Driver

Determination of proper USB Driver Installation is made by using the Computer's Device Manager tool. Access your Control Panel, System, Choose Hardware and click the Device Manager button



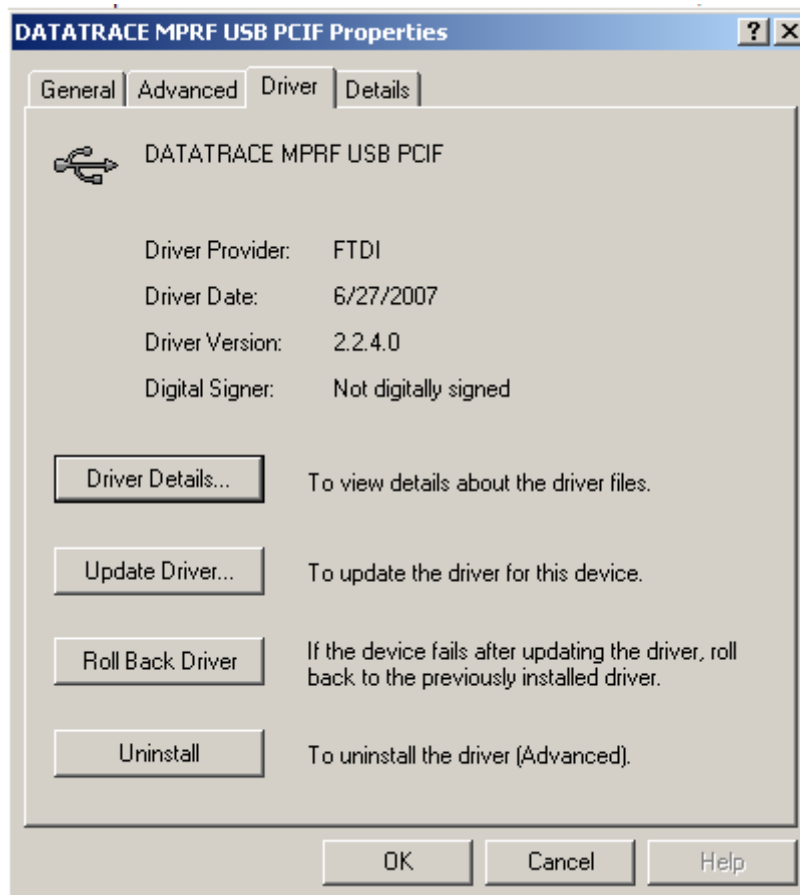
The Device Manager window will open. With only your MPRF USB Interface plugged in, expand the Ports "(COM and LPT)" and "Universal Serial Bus Controllers" items as shown below.



Note that there are no Communications Ports identified as DataTrace USB Ports (as was the case with earlier DTW USB Drivers); DataTrace should appear only in the USB controllers section. If it does appear as a COM port, see below.

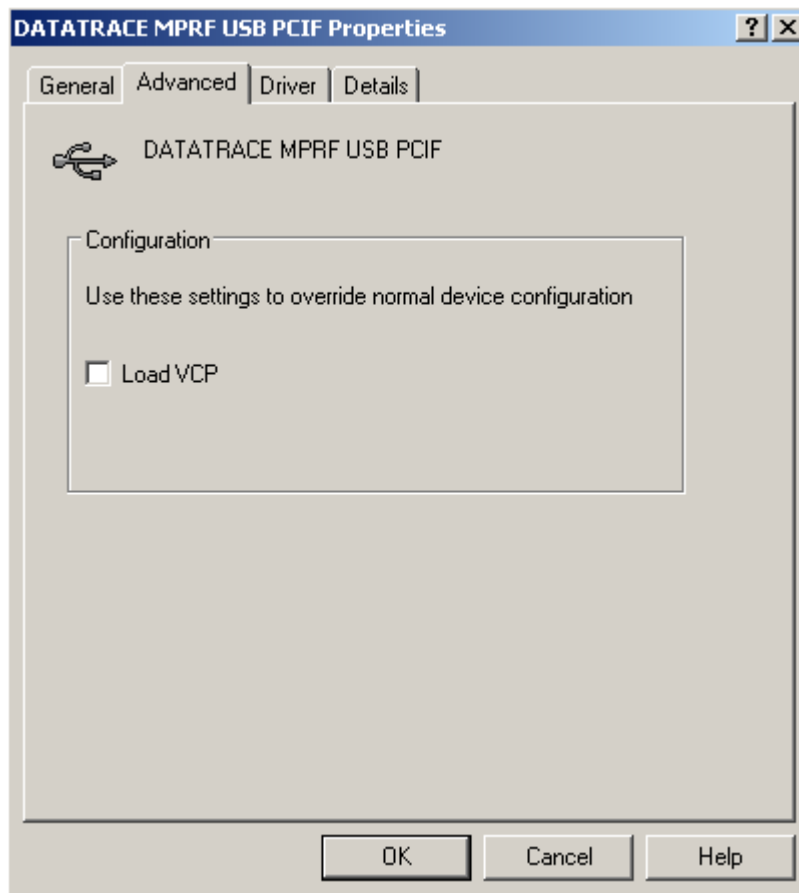
Check the USB Driver Version by right clicking on the DataTrace PCIF item and selecting Properties. Click the "Driver" tab. DTRF requires Driver version 2.2.4.0 dated 6/27/07 or newer, as shown below.





If the driver version is older, instructions for updating are given below.

Click the Advanced Tab and verify the VCP setting. This should be unchecked as shown below.



Note: for DataTrace MPIII type Interfaces which are intended for use with DTW 4.05 or newer, the VCP must be checked. The VCP check mark causes a Virtual serial COM Port to be created for DTW's use.

Close the properties window.

If the VCP setting was checked, it is the reason there was a Communication Port displayed in the serial ports section. After unchecking it, unplug your USB Interface, wait a moment for it to disappear from the device manager screen, and plug it back in. Verify a Comm Port does not appear.

**If New Hardware is not detected or the balloon does not indicate a DataTrace device:**

The Interface hardware may be damaged.

The Interface may have been installed using a non-DataTrace driver. Use and watch the Device Manager while plugging in and unplugging the Interface and observing if another device type appears. If so delete / uninstall the non-DataTrace USB driver, reboot and install the DataTrace USB drivers.

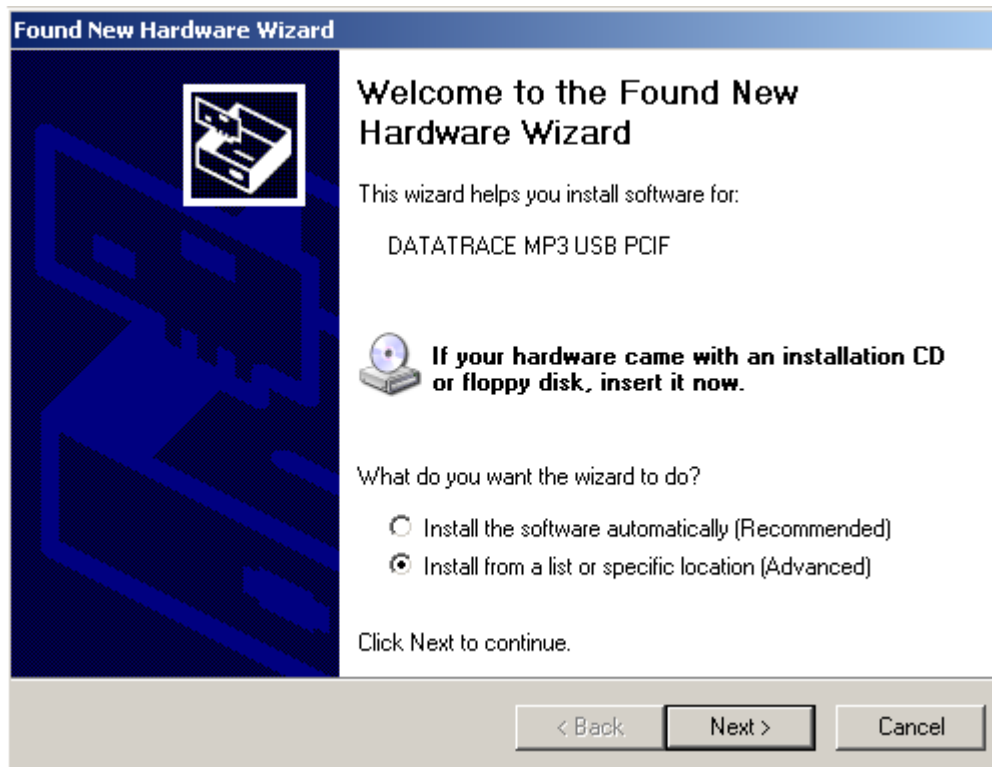
## If the Driver version(s) needs to be updated

From the device manager view, right click on the DataTrace USB device and select uninstall. If updating for DTW compatibility reasons, uninstall both the USB Controller and the Serial Port DataTrace Devices.

Verify that the CD with the USB Drivers is in the CD drive on your computer.

Wait a few moments and then plug the Interface back in.

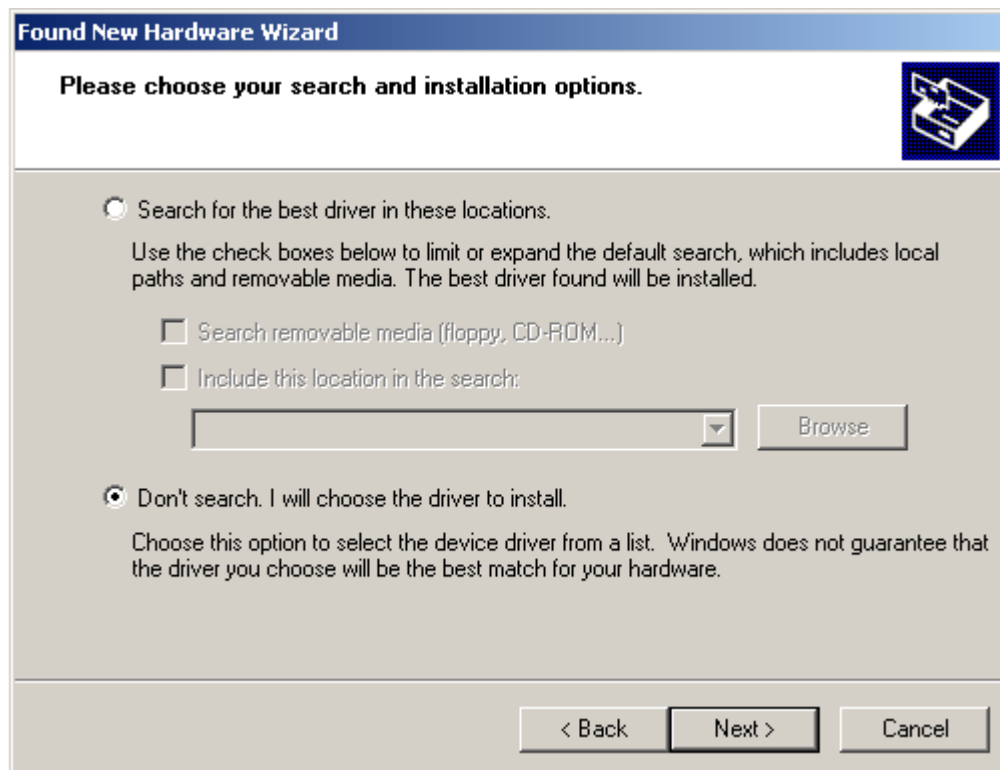
Soon after this connection is made a "balloon" will appear on the bottom right of your screen stating that "New Hardware Found" and identifying it as "DATATRACE MPRF USB PCIF". The following "Found New Hardware Wizard" screen will appear within a few moments. Some computer operating systems will have saved a copy of the original driver will then try to re-install using the same driver. It is recommended to select the driver location manually as shown in the following steps:



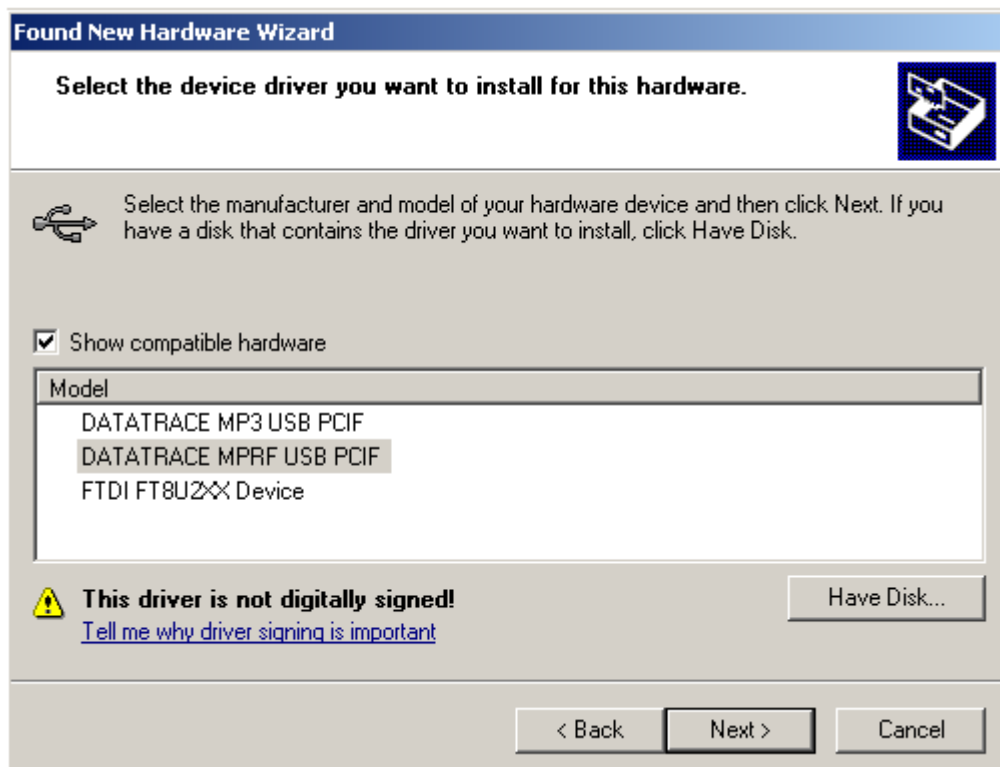
Under the "What do you want the wizard to do?" select "Install from a specific location" as shown.

Click "Next".

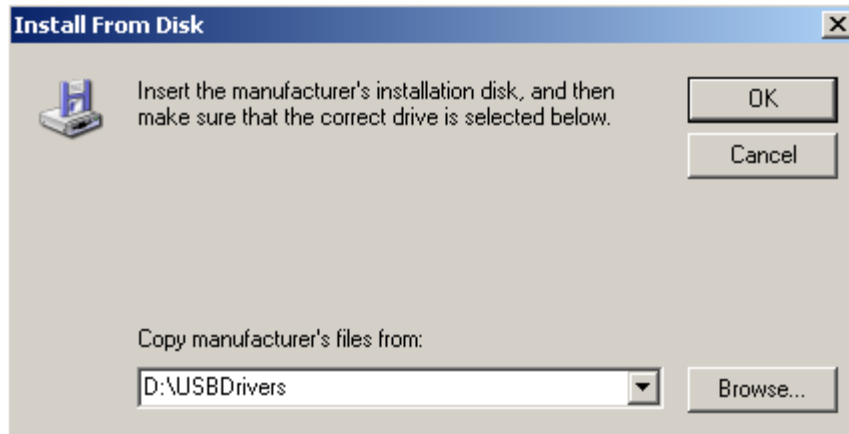
The next screen will appear; select the "Don't search option" as shown below and click Next.



The next screen will vary in appearance as it is displaying previously installed compatible drivers. Do not select any of these, but click the "Have Disk" button instead.



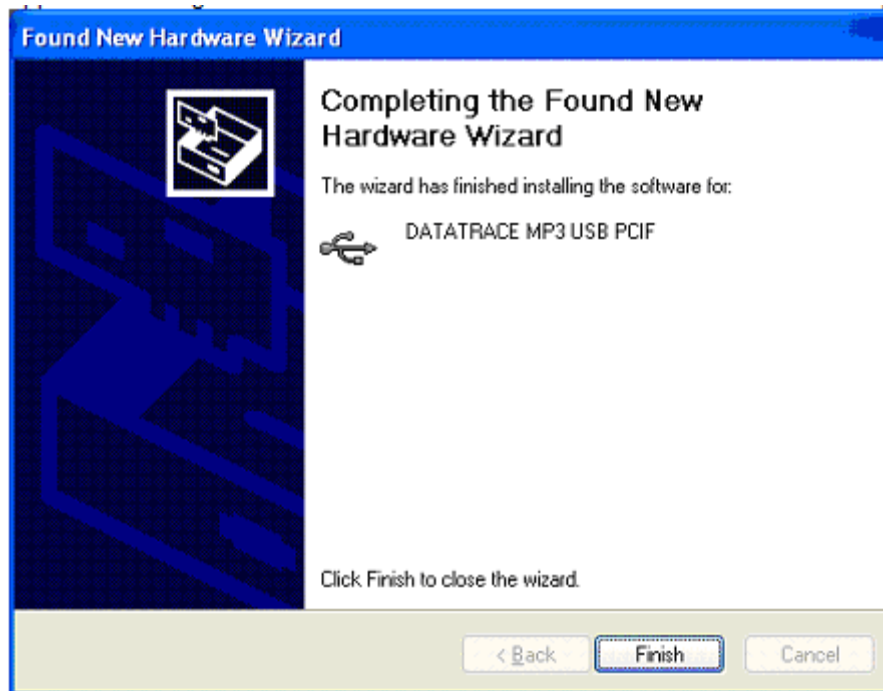
After clicking the "Have Disk" button, the following screen will appear. Use the Browse button and select the CD drive and USBDrivers directory. If the system requires selecting an actual file, choose the FTDIBUS.INF file.



Click the OK button and the Next button. The installation will begin. The following message may appear during the installation process. Ignore it by pressing "Continue Anyway" button.



When the files are retrieved and installed, the Next button will become active. Click the Next button and the following screen will appear indicating that the DataTrace MPIII USB Interface installation is complete.



Click the Finish button to complete the installation program. You are now ready to use your USB PC Interface.

### **If the Comm Port driver for DTW needs to be updated**

If you were updating a driver for an MPIII Interface with the intention of using it with DTW, access the device manager (as described above) and the properties of the DataTrace USB device. In the Advanced tab, place a check mark in the Load VCP check box. Unplug your MPIII PCIF wait a few moments and plug it back in. The New Hardware wizard will launch and a standard serial port installation will be performed. When Finished, verify a COM port is now available and note the COM port number so that DTW can be configured in serial ports selection to that same number.

### **Repeaters**

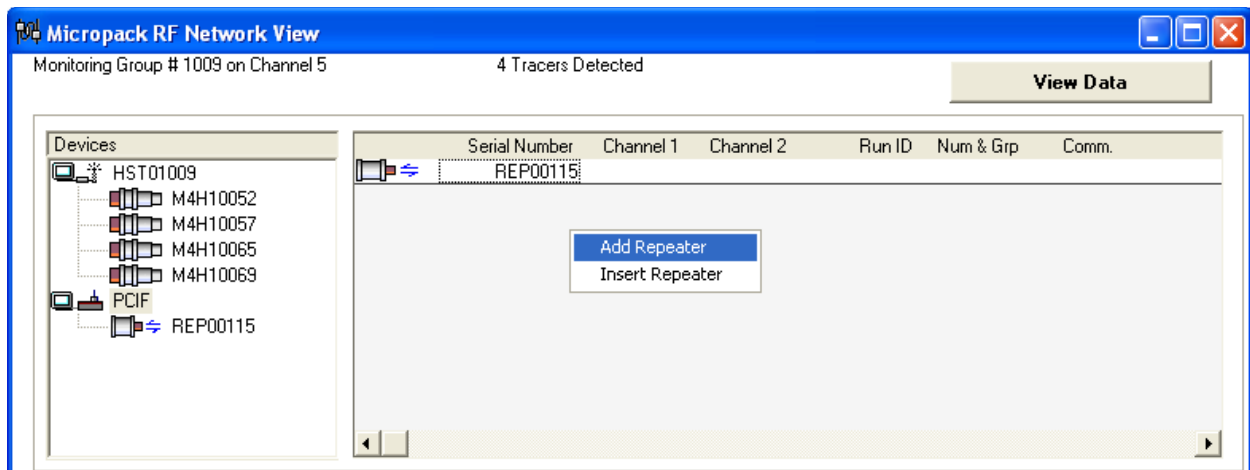
Repeaters are DataTrace devices which relay Radio signals in order to extend the effective transmission distance. Repeaters may also be used to enhance communications under difficult conditions. The need for using one or more repeaters is typically determined by trial and error or observation.

Like Tracers, Repeaters must also be programmed or otherwise properly configured. Each Repeater is configured for two (2) channels - one on which Channel to receive Tracer data (or receive data from another Repeater), and one on which to relay the data (typically the Channel the Host is receiving on).

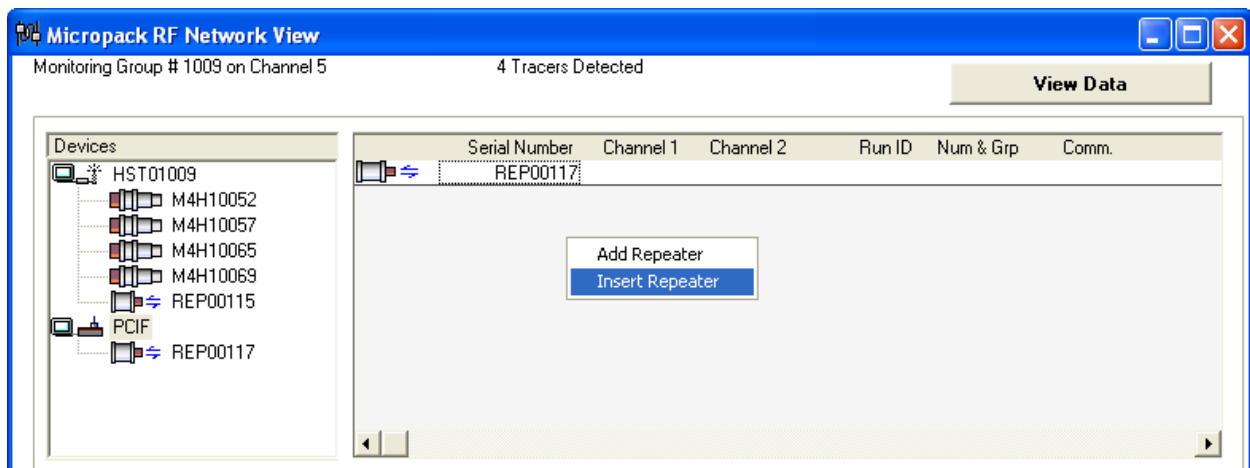
This configuration may be performed at the same time Tracer's are programmed by plac-

ing the Repeater in the Interface and clicking the Program button. An inquiry will be made requesting a new channel to use. The Repeater will be configured to Relay data to the Host (on the original Channel, without affecting any Tracer programmed before the Repeater), And the Repeater will receive data on the new channel. Any Tracer subsequently programmed will be configured to Transmit their data on this new Repeater's reception channel.

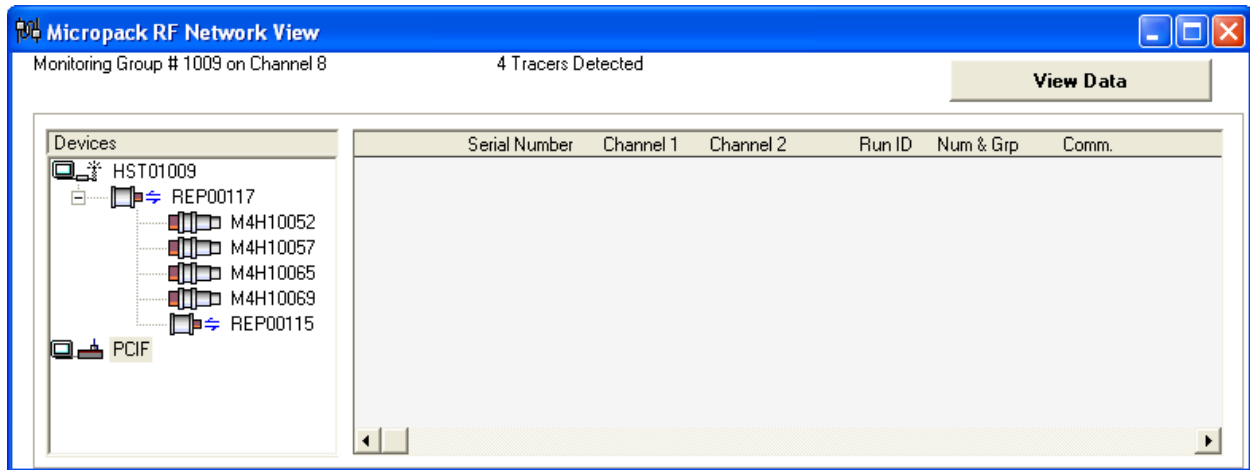
Repeaters can also be added or inserted dynamically to a group of Tracers already in radio use. The following screens demonstrate using the Network View screen to Add a Repeater or Insert a Repeater, and how Tracers can then be added to a previously programmed group of four Humidity MPRF Tracers.



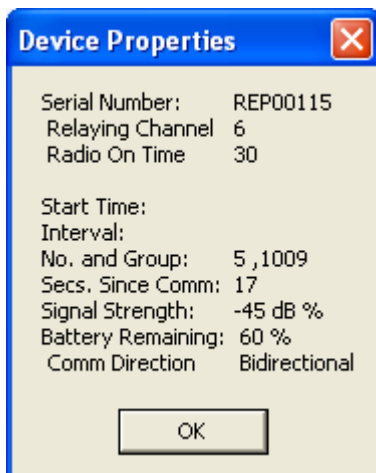
After an Interval or two pass, the new Repeater becomes visible. Another Repeater is placed in the Interface and identified, this time to perform an Insert Repeater process.



When a Repeater is Inserted, it is configured to Receive the data on the channel previously used by the Host, and the Host is reconfigured to new receive from the Repeater (note Host Channel changed from 5 to 8 in the example). This results in all data flowing through the newly inserted Repeater.

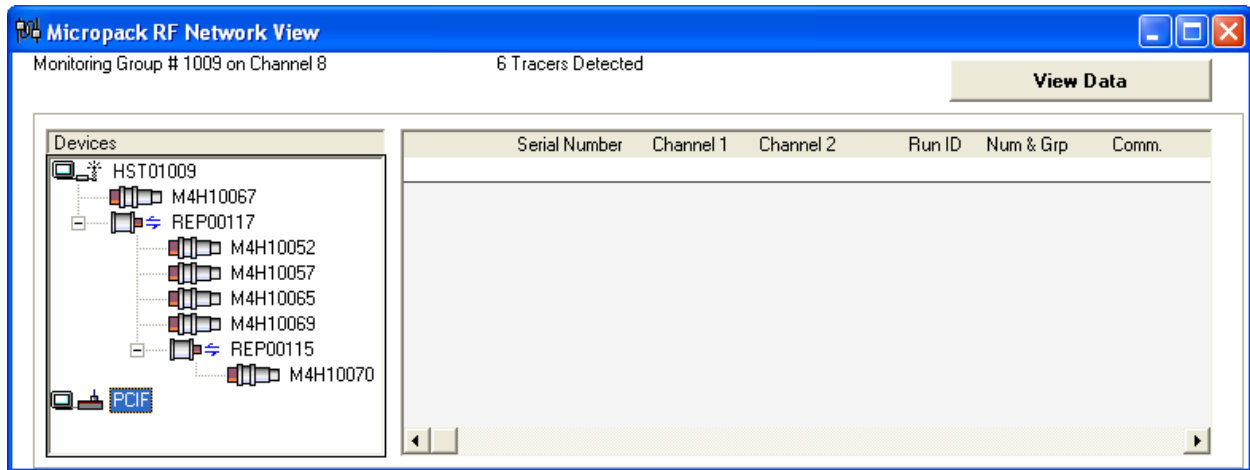


Tracers can be added dynamically to a group, and furthermore can be added such that they end up communicating either directly to the Host or through any of the Repeaters. To do this requires knowing what channel a Repeater is receiving on; Right click on a Repeater to inspect its properties.



When Tracer's are programmed from the Network screen, They can be configured to transmit through any of the available Repeaters or directly to the Host. If it is necessary to build a complex network, it can be accomplished using these methods.





As stated before, a Repeater can relay information from another Repeater; up to **3 Repeaters deep** is currently supported.

There is no real limit on the number of branches or total number of Repeaters, however, each repeater also consumes one member number, that is, 1 second of interval transmission bandwidth; the total number of Tracers and Repeaters will determine the minimum Interval allowed (when Fast Mode is not used).

Addition or Insertion of Repeaters while **Fast Mode** is in use is not allowed. Repeaters may be operated in Fast Mode, but they must be programmed in the standard Program Tracers screen as part of the entire Fast Mode group. Be sure to include any Repeaters in the count of Number of Tracers when using this feature.

**Removing a Repeater:** If a Repeater is placed in the Interface and stopped by clicking on the Interface icon, DataTrace RF will determine if that repeater had been relaying Tracer data. If so, the option will be given to reconfigure the Host receiver to Repeater's channel such that radio transmission will not be lost.

## ODBC Data Source

The ODBC Data Source provides a method for other computer applications to access Real Time Tracer radio data.

In the directory where DataTrace RF is installed, typically C:\Program Files\DataTracerF, is a file folder (sub-directory) named RadioDataSource which contains the file RFDa-ta.mdb. This file is a shareable Microsoft Access Database which is updated with data being received via radio while the Radio Network view is open. When the Radio Network view is closed, all the records within this file are cleared.

An example for using this would be to configure a Microsoft Excel spreadsheet to access the Tracer data. From Excel's menu Data > Import External Data > New Database Query, choose Options and Add, Browse and point to C:\Program Files\DataTracerF\RadioData-Source\RFDData.mdb, and then select RFDData as the Data Source. Excel can be set to automatically refresh the data, and a macro can be written to perform any desired calculation.

An example for the use of the Data Source would be to have a DCS (Distributed Control System) or other process control system monitor radio data and raise alarms or adjust controls if necessary.

## **MPRF Tracer Battery Replacement**

See below for [MPRF Repeater Battery Replacement](#)

Materials Needed:

- <sup>2</sup> DataTrace® MPRF Tracer(s)
- <sup>2</sup> Lithium Battery(ies), 1/2AA or Full AA to match Tracer style
- <sup>2</sup> Tracer Gripper
- <sup>2</sup> Tracer O-Ring(s), Optional
- <sup>2</sup> O-Ring grease, Optional
- <sup>2</sup> A Supply of Clean, Dry Cloths

Battery replacement for the MPRF Tracer is a simple and straight forward procedure. However, care must be taken that these procedures are followed completely to avoid equipment damage or personal injury.

We recommend that battery replacement for the MPRF Tracers take place in a dry, well-lit workstation. The best place for this activity would be close to the location that Tracers are stored and programmed and that Tracer batteries are stored.

**ONLY USE BATTERIES SUPPLIED BY MESA LABORATORIES, INC. Unapproved batteries may have dimensional differences or poor temperature performance which can damage the Tracer.**

**DO NOT USE ANY WRENCHES, PLIERS, VICES, OR ANY OTHER MECHANICAL MEANS TO LOOSEN OR UNSCREW THE Tracer IN ORDER TO EXPOSE THE BATTERY.**

1. Clean and dry the Tracer body completely. Make sure no process residue remains on the Tracer body that could cause the Tracer to slip from the your grasp during the battery change procedure or could contaminate the battery compartment during battery replace-

ment.

2. Place the Tracer Gripper over the top ring. Grasp the Tracer as shown. **Do not attempt to twist the lower amber colored circuit housing as this could cause damage.**



3. Loosen the Top ring. Keeping pressure on the Tracer in order to compress the internal springs will allow the ring to rotate freely and be easily unscrewed.



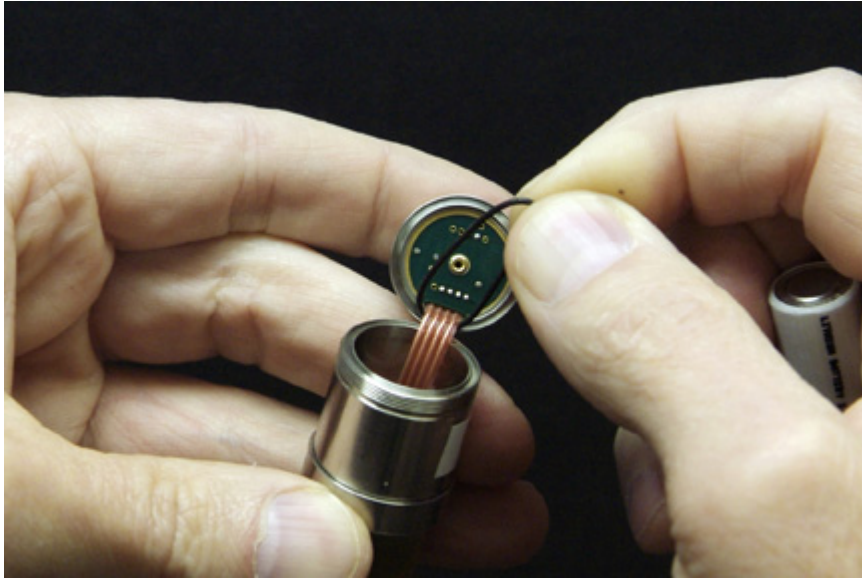
4. Once the ring is free, remove it by sliding it over the sensor and gently fold the sensor aside to expose the battery. Remove the old battery by grasping it and pulling it out or by turning the case over until it falls out.



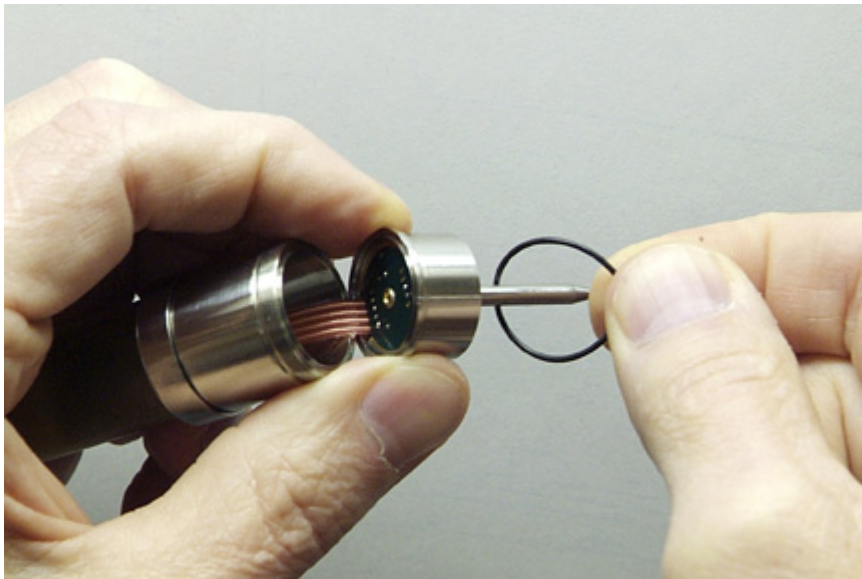
5. Dispose of the battery appropriately per local regulations. **DO NOT TRY TO RE-CHARGE, DISASSEMBLE, OR INCINERATE THE BATTERY.**

6. Examine the battery compartment for any signs of contamination, corrosion or liquid intrusion. If damage is detected or contamination is noted, return the Tracer to the factory for repair. Verify the O-ring is in place and intact.

OPTIONAL: O-ring replacement is optional; if your Tracers are periodically serviced or re-certified at Mesa Laboratories, Inc. the O-rings will have been replaced as a matter of standard service. If the O-ring is not being replaced proceed to Item 11.



7. If the O-ring is being replaced, slide it over the sensor and discard it. Clean any residue and grease from the threads and adjacent areas including the O-Ring groove on the Tracer body with a clean, lint-free cloth.



8. Before installing the new O-ring, apply a thin coat of silicone vacuum grease (in the Maintenance Kit) to the O-Ring.

<sup>2</sup> Use a **very small** amount of grease on your thumb and index finger.

<sup>2</sup> Place the O-Ring between these two fingers and gently pull the O-Ring through the grease until a light coating of grease completely covers the surface of the O-Ring.

9. Carefully slide the new O-Ring over the sensor and seat in the O-ring groove.



10. Clean any residue and grease from the threads and adjacent areas including the O-Ring groove with a clean, lint-free cloth.

You are now ready to reassemble the Tracer with a new battery. We strongly recommend that you do **NOT** leave Tracers unassembled. Damage to components could occur making your Tracers unusable.

11. Obtain a fresh battery from the battery tray. Do not remove more batteries than you need.

12. Note the polarity of the battery (the end with the stud is "+" ) and polarity indicator markings on the side of the Tracer. Place the battery in the Tracer matching the indicated polarity



13. Fold the sensor back onto the Tracer Body and verify it is aligned and that the O-Ring has not become displaced or pinched. Place the Ring over the sensor and tighten. Take care not to spin or twist the lower amber colored housing.



14. Wait approximately 20 seconds after the Tracer is reassembled with a new battery before trying to communicate with the Tracer. This allows the circuitry to "re-boot" following the battery change.

Following reassembly, always perform the Test Tracer procedure. This will assure that the battery is functioning properly, the electronics are reset correctly, and the Tracer is initialized. During the Test Tracer procedure, you will be asked if the battery was changed. Answer "Yes". Failure to do so will cause the battery gauge to be inaccurate.

Upon re-initializing the Tracer for the new battery, you will be instructed to place the Tracer aside for a few minutes. During this time the Tracer will perform a depassivation procedure on the battery. After the time has elapsed, perform the Test Tracer procedure again to verify proper measurements and communications.

If the Test Tracer procedure fails, remove the battery for 20 seconds, reinstall the same battery in the Tracer. Verify the battery was installed with the proper polarity. Wait 20 seconds then perform the Test Tracer procedure again. Should the procedure fail a second time, remove the battery and replace it with a new one. Perform the Test Tracer procedure again. If it fails a third time, return the Tracer to the factory for service.

## MPRF Repeater Battery Replacement

### Materials Needed

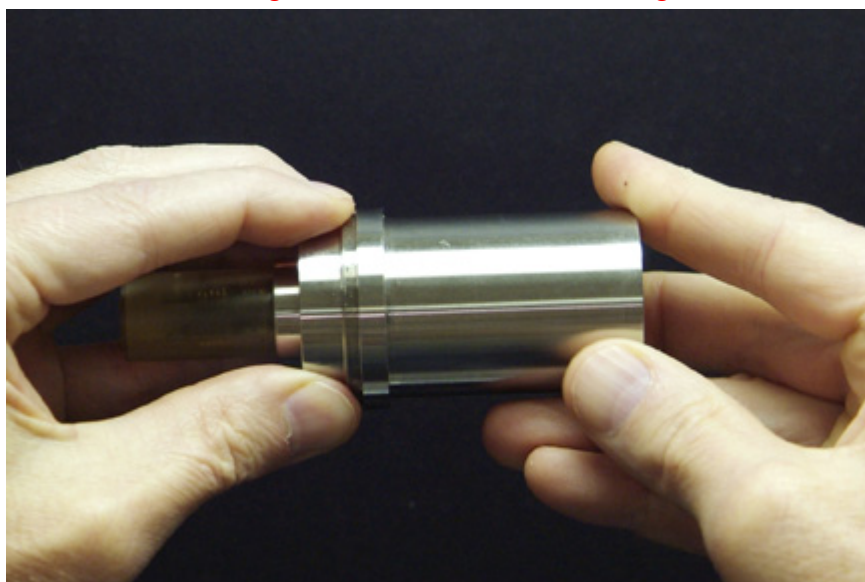
- <sup>2</sup> DataTrace® MPRF Repeater(s)
- <sup>2</sup> D size Lithium Battery(ies)
- <sup>2</sup> Repeater O-Ring(s), Optional
- <sup>2</sup> O-Ring grease, Optional
- <sup>2</sup> A Supply of Clean, Dry Cloths

Battery replacement for the MPRF Repeater is a simple and straight forward procedure. However, care must be taken that these procedures are followed completely to avoid equipment damage or personal injury.

**ONLY USE BATTERIES SUPPLIED BY MESA LABORATORIES, INC. Unapproved batteries may have dimensional difference which can damage the Tracer.**

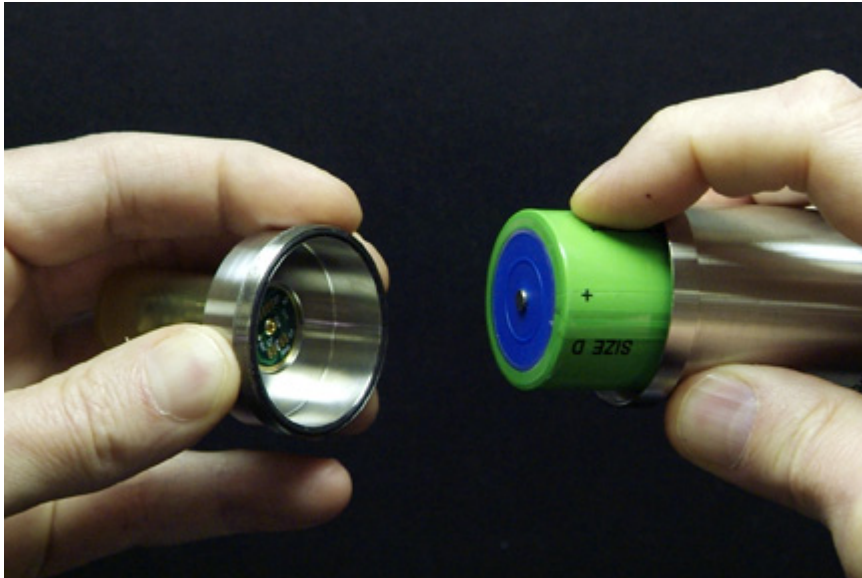
**DO NOT USE ANY WRENCHES, PLIERS, VICES, OR ANY OTHER MECHANICAL MEANS TO LOOSEN OR UNSCREW THE REPEATER IN ORDER TO EXPOSE THE BATTERY.**

1. Clean and dry the Repeater body completely. Make sure no process residue remains that could cause the Repeater to slip from the your grasp during the battery change procedure or could contaminate the battery compartment during battery replacement.
2. Grasp the Repeater as shown and unscrew (counter-clockwise) the battery cover. To minimize thread wear and facilitate this process, a small amount of pressure can be applied in order to counteract the internal spring force. **Do not attempt to twist the amber colored circuit housing as this could cause damage.**





3. Once the battery cover is free, remove the old battery and dispose of the battery appropriately per local regulations. **DO NOT TRY TO RECHARGE, DISASSEMBLE, OR INCINERATE THE BATTERY.**



4. Verify the O-ring is in place and intact on the circuit side of the Repeater. Examine the battery compartment for any signs of contamination, corrosion or liquid intrusion. If damage is detected or contamination is noted, return the Tracer to the factory for repair.



OPTIONAL: O-ring replacement is optional; if your Repeaters are periodically serviced at Mesa Laboratories, Inc. the O-rings will have been replaced as a matter of standard service. The O-ring need not be replaced if the Repeater is not exposed to harsh environments. If the O-ring is not being replaced proceed to Item 9.

5. If the O-ring is being replaced, Remove it from the O-ring groove discard it. Clean any residue and grease from the threads with a clean, lint-free cloth.

6. Before installing the new O-ring, apply a thin coat of silicone vacuum grease (in the Maintenance Kit) to the O-Ring.

<sup>2</sup> Use a **very small** amount of grease on your thumb and index finger.

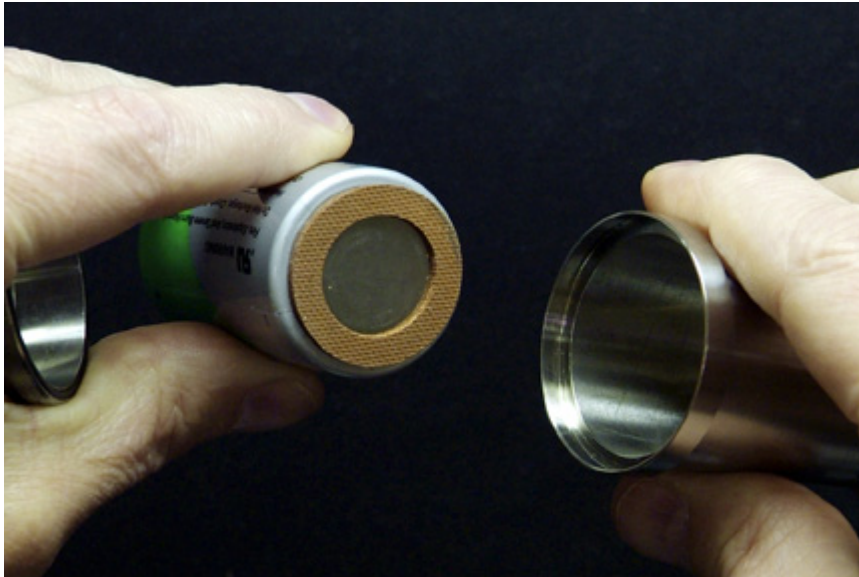
<sup>2</sup> Place the O-Ring between these two fingers and gently pull the O-Ring through the grease until a light coating of grease completely covers the surface of the O-Ring.

7. Carefully place the new O-Ring in the O-ring groove.

8. Clean any residue and grease from the threads and adjacent areas including the O-Ring groove with a clean, lint-free cloth.

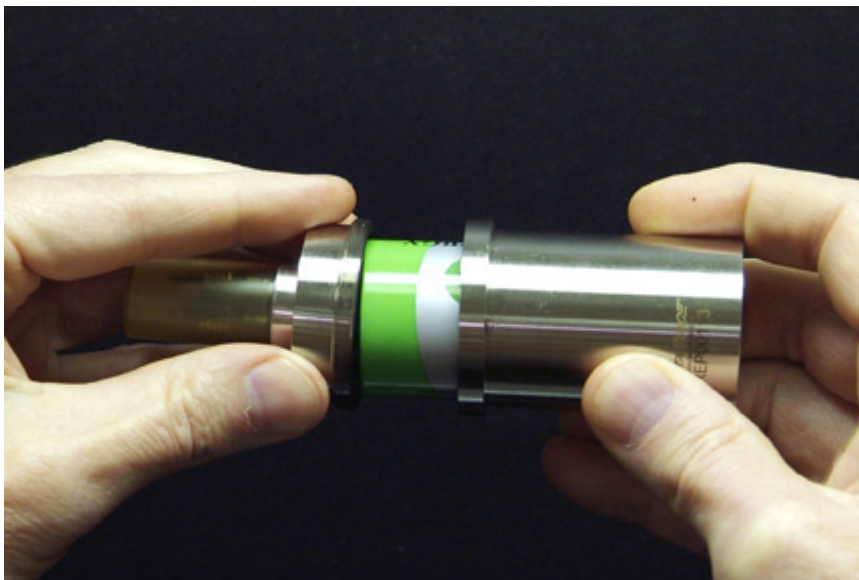
You are now ready to reassemble the Repeater with a new battery. We strongly recommended that you do **NOT** leave the Repeater unassembled. Damage to components could occur making your Repeater unusable.

9. Obtain a fresh battery. Verify the presence of an insulator ring on the bottom of the battery. **Do not use a battery that does not possess this insulator!**



10. Note the polarity of the battery (the end with the stud is "+" ) and polarity indicator markings on the side of the Repeater. Place the battery in the Repeater matching the indicated polarity.

11. Screw the battery cover back on to the Repeater circuit assembly. Verify the O-Ring has not become displaced or pinched. Take care not to spin or twist the amber colored circuit housing. Using a little pressure to counteract the spring will facilitate the process.



14. Wait approximately 20 seconds after the Repeater is reassembled with a new battery before trying to communicate with the Repeater. This allows the circuitry to "re-boot" following the battery change.

Following reassembly, always perform the Test Tracer procedure. This will assure that the battery is functioning properly, the electronics are reset correctly, and the Repeater is initialized. During the Test Tracer procedure, you will be asked if the battery was changed. Answer "Yes". Failure to do so will cause the battery guage to be inaccurate.

If the Test Tracer procedure fails, remove the battery for 20 seconds, reinstall the same battery in the Repeater. Verify the battery was installed with the proper polarity. Wait 20 seconds then perform the Test Tracer procedure again. Should the procedure fail a second time, remove the battery and replace it with a new one. Perform the Test Tracer procedure again. If it fails a third time, return the Repeater to the factory for service.

### **MPIII Battery Replacement**

#### **Materials Needed**

- <sup>2</sup> DataTrace® MicroPack III Tracer(s)
- <sup>2</sup> Lithium Battery(ies)
- <sup>2</sup> O-Ring(s)
- <sup>2</sup> Tracer Gripper
- <sup>2</sup> A Supply of Clean, Dry Cloths

Battery replacement in the MicroPack III is a simple and straight forward procedure. However, care must be taken that these procedures are followed completely to avoid equipment damage or personal injury. Refer to Figure 1.

We recommend that battery replacement for the MPIII Tracers take place in a dry, well-lit workstation. The best place for this activity would be close to the location that Tracers are stored and programmed and that Tracer batteries are stored.

**DO NOT USE ANY WRENCHES, PLIERS, VICES, OR ANY OTHER MECHANICAL MEANS TO LOOSEN OR UNSCREW THE Tracer BATTERY COVER. THE Tracer GRIPPER AND A COIN PLACED IN THE MPIII COVER GROOVE IS ADEQUATE TO OPEN AND CLOSE THE BATTERY COMPARTMENT. USING ANY OTHER DEVICE MAY DAMAGE THE Tracer AND MAY MAKE REASSEMBLY IMPOSSIBLE.**

1. Clean and dry the Tracer body completely. Make sure no process residue remains on the Tracer body that could cause the Tracer to slip from the your grasp during the battery change procedure or could contaminate the battery compartment during battery replacement.

2. Grasp the Tracer with the Tracer Gripper in one hand, clasping the base (probe end)

firmly. With your other hand, twist the battery cover counterclockwise. Use a coin in the cover's slot, if necessary.

3. Once loosened, remove the Gripper and the battery cover will unscrew easily.

4. Remove the old battery by turning the case over until it falls out.

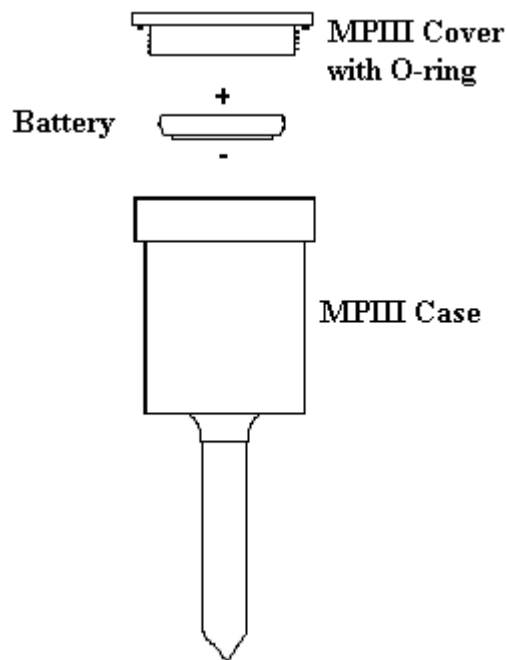
5. Dispose of the battery appropriately per local regulations. **DO NOT TRY TO RE-CHARGE, DISASSEMBLE, OR INCINERATE THE BATTERY.**

6. Examine the battery compartment for any signs of contamination, and make sure that the springs located in the cover and inside the battery compartment are in place. If one of the springs has fallen out, reinsert it.

7. Examine the threads of both the battery cover and Tracer body for damage and cleanliness. If the threads show any damage (e.g., cross threading or "burrs"), do not continue with this procedure. Loosely reassemble the Tracer and return it to the factory for repair.

8. If damage is detected or contamination is noted, return the Tracer to the factory for repair.

9. Remove the old O-Ring. **DO NOT USE O-RINGS THAT APPEAR DAMAGED. LEAKS COULD RESULT THAT MIGHT DAMAGE THE Tracer AND/OR SHORTEN BATTERY LIFE.**



10. Clean any residue and grease from the threads and adjacent areas including the O-

Ring groove on the Tracer body with a clean, lint-free cloth.

You are now ready to reassemble the Tracer with a new battery. We strongly recommend that you do **NOT** leave Tracers unassembled. Damage to components could occur making your Tracers unusable.

11. Obtain a fresh battery from the battery tray. Do not remove more batteries than you need.

12. Hold the battery + side up in the palm of your hand and place the battery cover over the battery, then, while holding the battery in place, turn this assembly over to access the threads.

Your battery installation is now complete. All that remains for you to do is reassemble the Tracer. The reassembly procedure, if followed completely, will seal the battery compartment, maintaining the waterproof and pressure-tight seal, as well as the intrinsically safe rating. **Always replace the O-ring when the Tracer battery compartment has been opened.**

13. Before you replace the O-Ring, apply a thin coat of silicone vacuum grease (in the Maintenance Kit) to the O-Ring.

<sup>2</sup> Use a **very small** amount of grease on your thumb and index finger.

<sup>2</sup> Place the O-Ring between these two fingers and gently pull the O-Ring through the grease until a light coating of grease completely covers the surface of the O-Ring.

14. Carefully place the O-Ring in the groove on the cap, centering it in the O-Ring groove.

15. Place the Tracer body squarely over the battery cover threads. Begin to screw the cover in a clockwise direction. Be careful to not cross thread the cover on the Tracer body threads. The cover should screw on smoothly and easily until the O-Ring becomes engaged.

16. Grasp your Tracer in one hand, clasping the base (probe end) firmly. With your other hand, twist the battery cover clockwise until resistance is felt. A coin can be used in the cover's groove to complete the tightening procedure.

Never tighten the battery cover more than finger tight. Never use anything to hold the Tracer Case except the Tracer Gripper. Over tightening can cause damage to your Tracer cover threads resulting in possible leakage which may damage your Tracer. The design of the Tracer seal is not dependent on high torque to provide an effective seal.

17. With a clean, dry cloth, wipe away any excess Silicone Vacuum Grease that may have been pressed out during closure. Silicone can become extremely slippery in combination with water and could cause the Tracer to slip from your hand and be damaged.



18. Wait approximately 20 seconds after the Tracer is reassembled with a new battery before trying to communicate with the Tracer. This allows the circuitry to "re-boot" following the battery change.

The reassembly process is now complete and your Tracer(s) is ready for use in your process.

Following reassembly, always perform the Test Tracer procedure. This will assure that the battery is functioning properly, the electronics are reset correctly, and the Tracer is initialized. During the Test Tracer procedure, you will be asked if the battery was changed. Answer "Yes". Failure to do so will cause the battery gauge to be inaccurate.

If the Test Tracer procedure fails, remove the battery for 20 seconds, reinstall the same battery in the Tracer. Wait 20 seconds then perform the Test Tracer procedure again. Should the procedure fail a second time, remove the battery and replace it with a new one. Perform the Test Tracer procedure again. If it fails a third time, return the Tracer to the factory for service.

## FRB Battery Replacement

### Materials Needed

- <sup>2</sup> DataTrace® MicroPack Tracer FRB Model(s)
- <sup>2</sup> Lithium Battery(ies)
- <sup>2</sup> Maintenance Kit
- <sup>2</sup> Tracer Grippers
- <sup>2</sup> A Supply of Clean, Dry Cloths

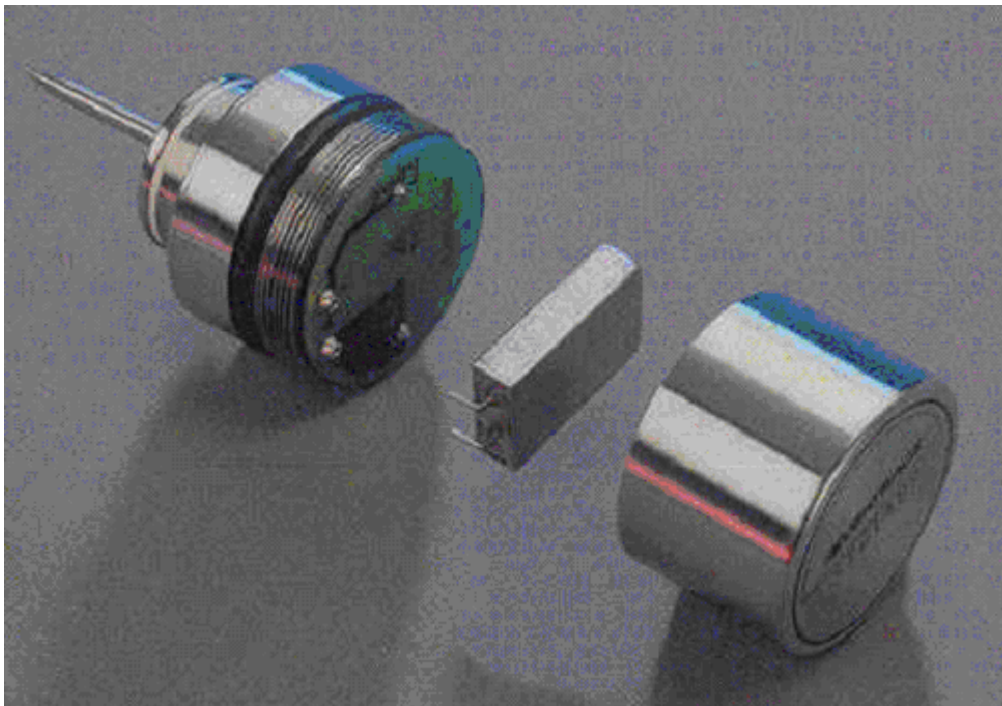
Disassembly of the FRB model MicroPack for battery change is a simple and straight forward procedure. However, care must be taken that these procedures are followed completely to avoid equipment damage or personal injury. Refer to Figure 2.

We recommend that the disassembly of the DataTrace® Tracers take place in a dry, well-lit workstation. The best place for this activity would be close to the location that Tracers are stored and programmed and that Tracer batteries are stored and conditioned.

**DO NOT USE ANY WRENCHES, PLIERS, VICES, OR ANY OTHER MECHANICAL MEANS TO LOOSEN OR UNSCREW THE Tracer BATTERY COVER. THE Tracer GRIPPER IS ADEQUATE TO OPEN THE BATTERY COMPARTMENT. USING ANY OTHER DEVICE MAY DAMAGE THE Tracer AND MAY MAKE REASSEMBLY IMPOSSIBLE.**

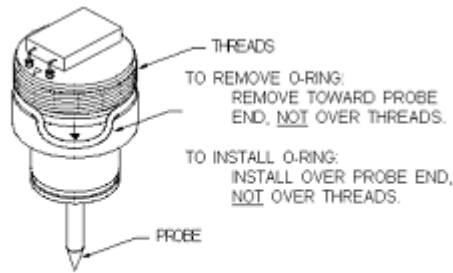
1. Clean and dry the Tracer body completely. Make sure no process residue remains on the Tracer body that could cause the Tracer to slip from the your grasp during disassembly or could contaminate the battery compartment during battery replacement.

2. Grasp the Tracer with the Tracer Gripper in one hand, clasping the base (probe end) firmly. With your other hand, using the other Gripper, twist the battery cover counterclockwise.
3. Once loosened, remove the Grippers and the battery cover will unscrew easily.
4. Remove the old battery by lifting straight out. Do not twist or turn the battery while removing.
5. Dispose of the battery appropriately per local regulations. **DO NOT TRY TO RECHARGE, DISASSEMBLE, OR INCINERATE THE BATTERY.**
6. Examine the battery compartment for any signs of contamination, pay particular attention to the battery socket area. If any contamination is found, remove it, and clean the area with a dry cloth.
7. Examine the threads of both the battery cover and Tracer body for damage and cleanliness. If the threads show any damage (e.g., cross threading or "burrs"), do not continue with this procedure. Loosely reassemble the Tracer and return it to the factory for repair.



8. Remove the old O-Ring. Refer to Figure 3. **DO NOT USE O-RINGS THAT APPEAR DAMAGED. LEAKS COULD RESULT THAT MIGHT DAMAGE THE Tracer AND/OR SHORTEN BATTERY LIFE.**





NOTE: DO NOT USE SHARP TOOLS TO REMOVE O-RING!

9. Clean any residue and grease from the threads and adjacent areas including the O-Ring groove on the Tracer body with a clean, lint-free cloth.

You are now ready to reassemble the Tracer with a new battery.

We strongly recommended that you do **NOT** leave Tracers unassembled. Damage to components could occur making your Tracers unusable.

Battery installation and assembly of the FRB model MicroPack after battery change is simple and straightforward. However, care must be taken that the procedure is followed completely to avoid equipment damage.

**DO NOT USE ANY WRENCHES, PLIERS, VICES, OR ANY OTHER MECHANICAL MEANS TO SCREW ON OR TIGHTEN THE Tracer BATTERY COVER. THE Tracer GRIPPER IS ADEQUATE TO CLOSE AND SEAL THE BATTERY COMPARTMENT IF ALL PROCEDURES ARE FOLLOWED. USING ANY OTHER DEVICE MAY DAMAGE THE Tracer AND MAY MAKE IT UNUSABLE.**

1. Obtain a fresh, conditioned battery. (See conditioning procedure in the next section.) Verify that the temperature range of the FRB Tracer and battery you plan to install are matched. Standard Temp batteries are rectangular and can be used in FRB Tracers with a **WHITE** or **RED** ring. LoTemp batteries are disk-shaped and should only be used in Tracers with a **BLUE** ring.

Standard Temp batteries (rectangular) and LoTemp batteries (round) have different pin configurations. The FRB Tracer sockets for Standard Temp and LoTemp Tracers are designed to accommodate only the appropriate batteries. So mixing up batteries and sockets is unlikely.

2. Holding the Tracer in one hand and the battery in the other, align the battery pins in the sockets on the Tracer.

3. Press the battery into the sockets until seated. This does not take much pressure. Do not twist or turn the battery as it is installed, as damage to the battery pins or Tracer sock-

ets could result.

Your battery installation is now complete. All that remains for you to do is reassemble the Tracer. The reassembly procedure, if followed completely, will seal the battery compartment, maintaining the waterproof and pressure-tight seal, as well as the intrinsically safe rating. **Always replace the O-ring when the Tracer battery compartment has been opened.**

1. Before you replace the O-Ring, apply a thin coat of silicone vacuum grease (in Maintenance Kit) to the O-Ring.

<sup>2</sup> Use a **very small** amount of grease on your thumb and index finger.

<sup>2</sup> Place the O-Ring between these two fingers and gently pull the O-Ring through the grease until a light coating of grease completely covers the surface of the O-Ring.

2. Carefully place the O-Ring in the O-Ring groove at the bottom of the Tracer body threads. Refer to Figure 3. Avoid dragging the O-Ring across the threads, they could cut or nick the O-Ring, compromising its sealing capability.

The best method of O-Ring installation is to start from the probe side and place one part of the O-Ring in the O-Ring groove. **Slightly** stretch the O-Ring with your fingers to position it completely over the O-Ring groove, then release it.

**DO NOT STRETCH THE O-RING ANY MORE THAN NECESSARY. DO NOT DEFORM THE O-RING.**

3. When the O-Ring is seated in the O-Ring groove, use the O-Ring Tool from the O-Ring Kit to make sure it is not twisted or has become damaged during installation. Do not use any sharp tools with O-Rings.

4. Place the battery cover squarely over the Tracer body threads. Begin to screw the cover in a clockwise direction. Be careful to not cross thread the cover on the Tracer body threads. The cover should screw on smoothly and easily until the O-Ring becomes engaged.

5. Grasp your Tracer in one hand, clasping the base (probe end) firmly. With your other hand, twist the battery cover clockwise until the O-Ring seems to disappear.

Never tighten the battery cover more than finger tight. Never use anything to tighten the Tracer Battery Cover except the Tracer Gripper. Over tightening can cause damage to your Tracer cover threads resulting in possible leakage which may damage your Tracer. The design of the Tracer seal is not dependent on high torque to provide an effective seal.

6. With a clean, dry cloth, wipe away any excess Silicone Vacuum Grease that may have been pressed out during closure. Silicone can become extremely slippery in combination with water and could cause the Tracer to slip from your hand and be damaged.

The reassembly process is now complete and your Tracer(s) is now ready for use in your process.

Following reassembly, always perform the Test Tracer procedure. This will assure that the battery is functioning properly, the electronics are reset correctly, and the Tracer is initialized.

## **FRB MICROPACK BATTERY PRECONDITIONING:**

### **Materials Needed**

<sup>2</sup> DataTrace® Modified Battery Clip Connectors

<sup>2</sup> Lithium Battery(ies)

Battery conditioning is a simple, straightforward procedure. We recommend that conditioning of DataTrace® Batteries take place at a dry, well-lit workstation, just prior to installation in your Tracer. The best place for this activity would be close to the location that Tracers are stored and programmed, Tracer batteries are replaced, and Tracers are assembled and disassembled.

Each set of DataTrace® Modified Battery Clip Connectors can prepare one battery at a time for installation into your Tracers. It is best to have as many Battery Clip Connectors available for the conditioning process as the number of batteries needed for replacement.

Batteries should be installed into Tracers within eight (8) hours of the conditioning procedure. Prepare only enough batteries for the current session of battery replacements.

Remember that replacement of the battery does not automatically recalibrate the Tracer. Normal calibration procedures should be instituted to have each Tracer factory calibrated at least once each year or in conformance with your in-house procedures.

### **NOTE:**

The batteries used in the DataTrace® equipment are specially designed for this application. **USE ONLY BATTERIES SUPPLIED BY DataTrace®.** Using any other lithium battery will void the DataTrace® equipment warranty and could damage DataTrace® equipment.

We recommend that you do not try to condition batteries at the same time you are disassembling and reassembling your Tracers. It is very easy to confuse old batteries with new ones and you might reinstall an old battery into your Tracer by mistake.

1. Clear an area at your workstation to accommodate your DataTrace® Batteries you will need to prepare. Do not take any more batteries from their container than you intend to use at this session.

**WARNING.** Do not allow the battery pins of one battery to contact those of another. This will cause a short which could damage or discharge the battery.

2. Connect the Battery Clip Connectors to the battery terminals. It makes no difference which connector is attached to which of the indicated terminals.
3. The normal conditioning process takes 3 to 3.5 minutes. Allow the battery to lie undisturbed during this period.
4. Remove the Battery Clip Connectors from each battery and allow the battery to "sit" for approximately one (1) minute before installation into a Tracer.



Click here for standard [DataTrace RF Help](#) File

### **Installation Instructions for DataTrace® RF (DTRF) software**

Minimum System Requirements: Windows XP or Vista1 Operating System with 512 MB RAM, at least one available USB 2.0 port2, 100 MB disk space and Administrator Privileges (during the installation).

**Notice:** If DataTrace® for Windows software is already present on your computer you should back-up or archive your data first. Refer to your DTW® Operator's Manual for more details. It will not normally be necessary to un-install an existing version. The current configuration and data will normally be preserved.

**Notice:** The DataTrace® database has three security options which must be declared at the time of installation. Refer to the DTRF User Manual located on the CD or see [Data Security](#).

Put the DataTrace® RF software application CD in your computer CD drive. In a few seconds a setup menu will appear. The DTRF Help File or DTW® Operator's Manual can be reviewed prior to installation if desired. If the setup menu does not appear, access the CD and run "Launch.exe."

Click on the Install / Update Database option. Follow the on-screen instructions and accept the default options to install the Database. When prompted, select the desired security option.

After the Database has been successfully installed, select the Install DataTrace® RF op-

tion. Follow the on-screen instructions and accept all default options to install DataTrace® RF software application.

Adobe Acrobat Reader is required for viewing and printing reports. Install it now, if it is not already on your computer.

After the installation is complete, when DataTrace RF is used for the first time, you will be asked to set the Data Path. Accept the default option unless you intend to use a Network Server for your data storage (i.e. A LAN type setup). See [Network Installation / Data Path](#) for additional details.

If a security option was selected, your system administrator must setup user accounts before DataTrace® RF can be launched. For details refer to the DTRF User Manual Appendix V.

### **Installation Instructions for DataTrace® RF USB Interfaces**

**Notice:** If you have previously installed a MPIII DataTrace® USB interface and intend to use it, you must upgrade the USB driver. Refer to the [USB installation](#) or [USB Troubleshooting](#) for additional details. Older serial (DB9) MPIII interfaces are not supported in DTRF.

Place the DataTrace® RF CD in the CD drive of your computer. Remove the MPRF Host PC Interface from its packaging. Connect the USB cable to the Interface module and to an available USB port on your computer.

Soon after this connection is made a "balloon" will appear in the lower right corner of your desktop screen, identifying a new device as "DATATRACE USB PCIF". The "Found New Hardware Wizard" screen will appear within a few moments.

Select the "Install the software automatically (Recommended)" option and click "Next". If a message appears regarding digital signatures, ignore it by clicking the "Continue Anyway" button. When indicated, click the "Finish" button to complete the driver installation.

#### **Footnotes:**

1. Vista O.S. compatibility was tested with Service Pack 1 installed. Technical support for Vista installations may be limited.

2. USB 1.0 ports may function but have not been tested.

### **[Network Installation - Data Path](#)**

The DataTrace RF database requires the user to specify the location where data will be stored. The inquiry for this location will occur the first time DataTrace RF is launched.

The default data storage location is on the local machine, but the system can be config-

ured to store data on a Network server and thus allow data sharing among all computers using DataTrace RF that are specified to store data at a common location.

To install using a Network type setup:

1. Create a folder on the Network server. Select an appropriate name for the folder, such as "DataTrace DB". This folder must have read and write access rights for those users that will be sharing data.
2. Install the Database and DataTrace RF on each "local" machine. Run DataTrace RF and when the Data Path screen launches, browse to and select the newly created common folder.

**Notice:** In the current implementation of DataTrace RF, some of the system setup and configuration parameters will also reside in the common folder. This includes items such as Units of Measure and Lethality constants. If any user changes such setup and configuration items, the changes will apply to all subsequent users!

### **Changing the Data Path after Installation**

If it is desired to convert between Local to Network operation, or vice versa, or organize data using different project dependant storage locations on the same computer, the Data Path may be changed as follows:

From DataTrace RF, open the DataBase Utilities window (click the "Utilities" button). With this window open, access the Edit menu item, and then select "Data Path".

**Notice:** There does not exist any utility or method for transferring data between the different storage locations! Data Path changes are recorded in the Audit Trail log of the original Data Path location.